DWR

FALL 2016

a magazine from the California Department of Water Resources

Water comes to East Porterville

Security and Emergency Preparedness – A New Norm: California is a state of extremes. It has been hot, dry, wet, on fire, hit by big waves, and shaken by earthquakes over the past year. We seem to always be setting new records with the help of Mother Nature. It has also been a difficult year regarding increased security concerns at home and at work with domestic and terrorist events we have not seen before. This is not unusual for our State.

In recent years I have had the privilege to work with many of our staff as they rise to the challenges that come before the Department. There continues to be unprecedented requests of the Department, of old and new programs, and of our staff. The Department's mission is broad yet critical to the people we serve – especially for public safety. The Department has performed well in the past and expectations are high that we continue our good work. And I know we will.

With the many extremes we find ourselves in, we must continue to expand our capacity to prepare, respond, and recover from manmade and natural disasters and to improve our security measures. The Department has taken many actions to expand our security and emergency management capacity such as updating plans and policies, developing committees, executing drills and exercises, responding to and recovering from various events, and supporting other agencies. However, there is still much more work to be done.

One of the highest priorities for all public employees is to assist in the responsibility of preserving life and property of the residents of our State. Under California law, all public employees are "Disaster Service Workers" and may be called upon in the event of a disaster. We should not get hung up on whether an event is an emergency or a disaster. We just need to prepare our staff for that "bad day" at work. The actions we take to respond and recover from an emergency or a disaster are not going to be that different. Together, we should plan and train for the worst day. By doing so, we will expand our capacity to respond to security and emergency events and we will manage any size and type of an event that comes our way.

Do you know what your security or emergency role is at work?

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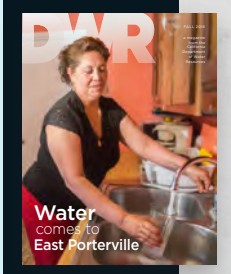
WHAT'S INSIDE



On the cover: Mrs. Ramirez becomes first homeowner in East Porterville to receive water from water supply project.

Inspection is the Key

DWR Quagga and Zebra Mussels Prevention Program Receives Funding

BY CHRISTINA JIMENEZ

DWR's Aquatic Nuisance Species Program, created in 2007, is helping prevent entrance of invasive species in the State Water Project. DWR was awarded a two-year Quagga and Zebra Mussel Infestation Prevention Grant for Pyramid and Castaic Lakes in April 2016.

"Fish and Game Code Section 2302 mandates that all California reservoirs open to the public for recreation, including State Water Project lakes, have a mussel prevention plan in place," said DWR Senior Environmental Scientist Brianne Sakata, who works in the Department's Operations and Maintenance Environmental Assessment Branch's Aquatic Nuisance Species Program. "For DWR, that means boat inspections."

The Quagga and Zebra Mussel Infestation Prevention Grant has been administered by the California State Parks' Division of Boating and Waterways since 2014. Recipients of the grant can use the funding on vulnerability assessments or on mussel prevention programs.

DWR will use the $800,000 grant on boat inspection staff hours. Prior to the grant, DWR internally funded the boat inspections.

"The grant funding is derived from the mussel prevention fee collected when Californians register boats with the Department of Motor Vehicles – a mandate by the Harbors and Navigation Code since January 1, 2013," said Sakata. "Grants are available to managers and owners of reservoirs that are open to the public and not infested with the invasive mussels."

More than 124,000 watercraft inspections for mussels have been performed at Castaic Lake since 2011.

Examining Watercraft

Before boats can enter Pyramid and Castaic Lakes, all watercraft must undergo a boat inspection completed by trained inspectors.

Staff searches for quagga and zebra mussels attached to the boat, motor and trailer and for the presence of water in the motor, live wells, compartments and bilge. Contracted by DWR, inspections are done each day of the year by Los Angeles County Department of Parks and Recreation staff.

Thorough searches of the watercraft are done in two locations at Castaic Lake and one location at Pyramid.

"To pass the inspection and enter the lake, watercraft must be clean, dry and mussel-free," said Sakata. "Any vessel coming from a mussel-infested water body is prohibited from entering State Water Project lakes for seven days."

Pyramid Lake, Castaic Lake and San Luis Reservoir boat inspections began in 2011 and at Silverwood Lake, Lake Perris and Lake Del Valle in 2009. DWR is expected to reapply in 2018 for another Quagga and Zebra Mussel Infestation Prevention Grant.

For grant information, visit the State Parks Division of Boating and Waterways Website at **http://dbw.parks.ca.gov/Funding/QZGrantApp.aspx**. For mussel prevention information, visit the California Department of Fish and Wildlife Website at **https://www.wildlife.ca.gov/Conservation/Invasives/Quagga-Mussels**

The Dutch Slough Tidal Marsh Restoration site in Oakley covers 1,178 acres in Eastern Contra Costa County.

Delta Restoration Project Gets Green Light

By Jennifer Iida

In July 2016, the Dutch Slough Tidal Marsh Restoration Project was issued a construction permit by the U.S. Army Corps of Engineers. Reclamation District 2137 will start taking contractor bids this winter, and construction crews will break ground in spring 2017.

Located in the City of Oakley in the western Delta, the former dairy lands were slated for residential development but were instead purchased by the State to restore critical Delta habitats.

This project is part of the Delta Levees Program, which provides funding for levee improvements and mitigation of projects impacts and also is mandated to result in "net habitat improvement" in the Delta. "This Delta restoration project will help to meet that habitat improvement mandate," said Patty Finfrock, Environmental Restoration and Enhancement Program Manager in the Division of Integrated Regional Water Management. "We are thrilled to see the project finally go to construction."

The restoration project will create vital aquatic and terrestrial habitats for native fish, plants and wildlife in the Delta. When restored, the three site parcels will include more than 500 acres of tidal marsh, 100 acres of open water, 120 acres of managed marsh and more than 400 acres of enhanced upland habitats. The project will also provide a scenic pedestrian trail to complement a community park planned for the area.

Construction of the first two parcels will include earthmoving in 2017 and 2018, planting native plants, particularly tules, in fall 2018 and then cultivating them for a year or two.

Once the tules have spread over the marsh area, the site will be breached by excavating an opening in the levee to allow water from the adjacent Delta channel to enter the network of new channels throughout the site.

"A lot of tules will be planted," Finfrock said. "We need them to be well established before we breach. They will hold the soil in place and prevent massive erosion, and we don't know how long that will take. We plan to breach in either 2019 or 2020. We don't have even a tentative timeline yet for the third parcel because there are some design issues we need to work out first."

DWR, State Coastal Conservancy (SCC), California Department of Fish and Wildlife (DFW), Natural Heritage Institute (NHI), California Bay-Delta Authority, Reclamation Districts 2137 and 799 and several local agencies are all working together on this project.

The CALFED Ecosystem Restoration Program and SCC provided the funds to purchase the property and to do the initial planning, including a conceptual restoration plan, feasibility study and the Environmental Impact Reports. The final planning and implementation will be paid for by DWR, SCC, DFW, U.S. Fish and Wildlife Service and the Environmental Protection Agency.

Drought's Ground Zero

East Porterville Residents Connected to Water Supply

By Doug Carlson

(Left to Right) DWR Engineers Everett Penn and Robert Trang answer questions about connecting to water supply project during a public meeting at Porterville's Granite Hills High School in October.

DWR's six-decade service to California has included a long string of success stories throughout the state, but perhaps no project has been more impactful in a humanitarian sense than what's happening now deep in the Central Valley.

Residents of East Porterville in Tulare County, often called drought's "ground zero," now can turn on their taps and be confident a sustainable, safe-to-drink stream of water will flow.

Imagine losing access to a potable water supply in your own home, not for days, but for years. That happened in East Porterville as California's five-year drought reduced surface water supplies, increased the Central Valley's

(Left) Contractor in November prepares to install a section of main pipeline to be used for homes in Phase I of the East Porterville water supply project. (Top) East Porterville residents attended public meeting to learn about the three step process for connecting to water supply project. (Bottom Right) DWR Senior Engineer Steve Doe, who became Project Manager in October, updates public about the water supply project's phase two at the October meeting in Porterville.

reliance on groundwater and dropped the water table below the reach of many wells in the community.

Hundreds of them went dry in unincorporated East Porterville, which has no water distribution system. Fortunately for residents, State agencies stepped up to provide emergency water delivery during this extraordinary drought.

Since 2014, the Governor's Office of Emergency Services (OES) has assisted with water deliveries to temporary holding tanks installed at East Porterville homes at a monthly cost of more than $650,000. Volunteers and non-governmental organizations delivered bottled water during the crisis.

DWR's involvement has been critical to the project's success. DWR conducted the East Porterville Water Supply Project Feasibility Study, which concluded that the most practical solution among the several options analyzed is to connect East Porterville homes to the City of Porterville's water system.

The Study was a critical piece because it

helped convince residents that the proposed arrangement with the City of Porterville would work; it also established the governance of the new water distribution system to achieve efficient operations.

DWR employees designed the new system, negotiated with Tulare County and Porterville officials to achieve necessary agreements and met numerous times with residents to explain the project.

New water lines currently are being laid along East Porterville streets to expand the City of Porterville's system, which eventually will provide service to up to 1,100 East Porterville homes whose wells are dry or contaminated.

Greg Farley, DWR Drought Manager, led the department's team in Tulare County.

"Our biggest challenge was to get the partners to believe our vision could be accomplished," Farley said. "We were given a tall task to have a new water system in by the end of 2016. The way I looked at it, we put a man on the moon, and this is a lot easier than that."

"Our team looked for solutions, not problems," Farley continued. "After the local partners saw that the State had the resolve to solve this, everyone got behind us."

The effort faced big challenges. Unincorporated East Porterville had little or no infrastructure planning. Robert Trang, East Porterville Water Supply Project Manager until October, said DWR was tasked with delivering a well-designed water system in that environment in an extremely short amount of time.

"We had to bridge the gap between local government in Porterville and the East Porterville community," Trang said. "Implementing facilities to address the emergency was critical, but at the same time, we had to provide infrastructure compatible with Porterville's long-term planning."

DWR employees worked on a daily basis with their colleagues in the other State agencies and in local government. The State Water Resources Control Board exercised its powers to facilitate the consolidation of East Porterville's unincorporated community with the existing Porterville water system.

DWR also collaborated with East Porterville non-profit organizations that are committed to ensuring social justice to the community's drought victims. Public meetings with simultaneous interpretation services for Spanish speakers helped East Porterville residents understand the project.

State Water Resources Control Board Assistant Deputy Director James Maughan (above) and DWR's Drought Manager Greg Farley until October 2016 (below) answer questions about new water supply project for East Porterville in Tulare County at a June public meeting.

Residents and homeowners deemed eligible for the program are being connected to the permanent water supply after they agree to cap their existing wells and have their property eventually annexed by the City of Porterville.

The first connections were made on August 19 to the home of Leonicio and Guillermina Ramirez and their daughter Tania, who said, "We're so happy. It was kind of scary to know there was no water."

Farley and Trang said a common reaction among residents was that they couldn't believe their water problem was finally going to be resolved after years of relying on water deliveries and rationing the little water they had.

Bill Croyle, DWR's Deputy Director for Statewide Emergency Preparedness and Security, was on hand when the water first flowed to the Ramirez residence. "I had chills when they turned the water on," Croyle told the Los Angeles Times. "Just seeing the smiles on (their) faces.... They should never have to worry about this ever again."

On a personal level, Farley and Trang said the East Porterville project has been emotionally satisfying and professionally rewarding.

"The path was not clear," Farley said, "but from our project management training, we knew how to lay out the plan with a clear, intended outcome in mind, so we forged ahead."

Not much good can be said of California's historic drought, but one positive outcome is the new awareness among Californians that they can save water by accepting water conservation as their California way of life.

Another surely is what's happening in East Porterville.

(Above) Water line of first home to receive water from East Porterville water supply project is buried by State and local officials during August event. (Center) Mr. Ramirez, who was the first East Porterville homeowner to receive water from the project, fills a pitcher as his daughter looks on. (Left) Bill Croyle, DWR Statewide Emergency Preparedness and Security Deputy Director, celebrates the first flow of water in this East Porterville home.

Understanding Drought Risk

By Jeanine Jones, Interstate Resources Manager

Existing law requires water systems serving more than 3,000 customers or 3,000 acre-feet annually to submit an urban water management plan (UWMP) to DWR every five years. UWMPs must include a water shortage contingency plan that describes how systems will respond to a three-year drought.

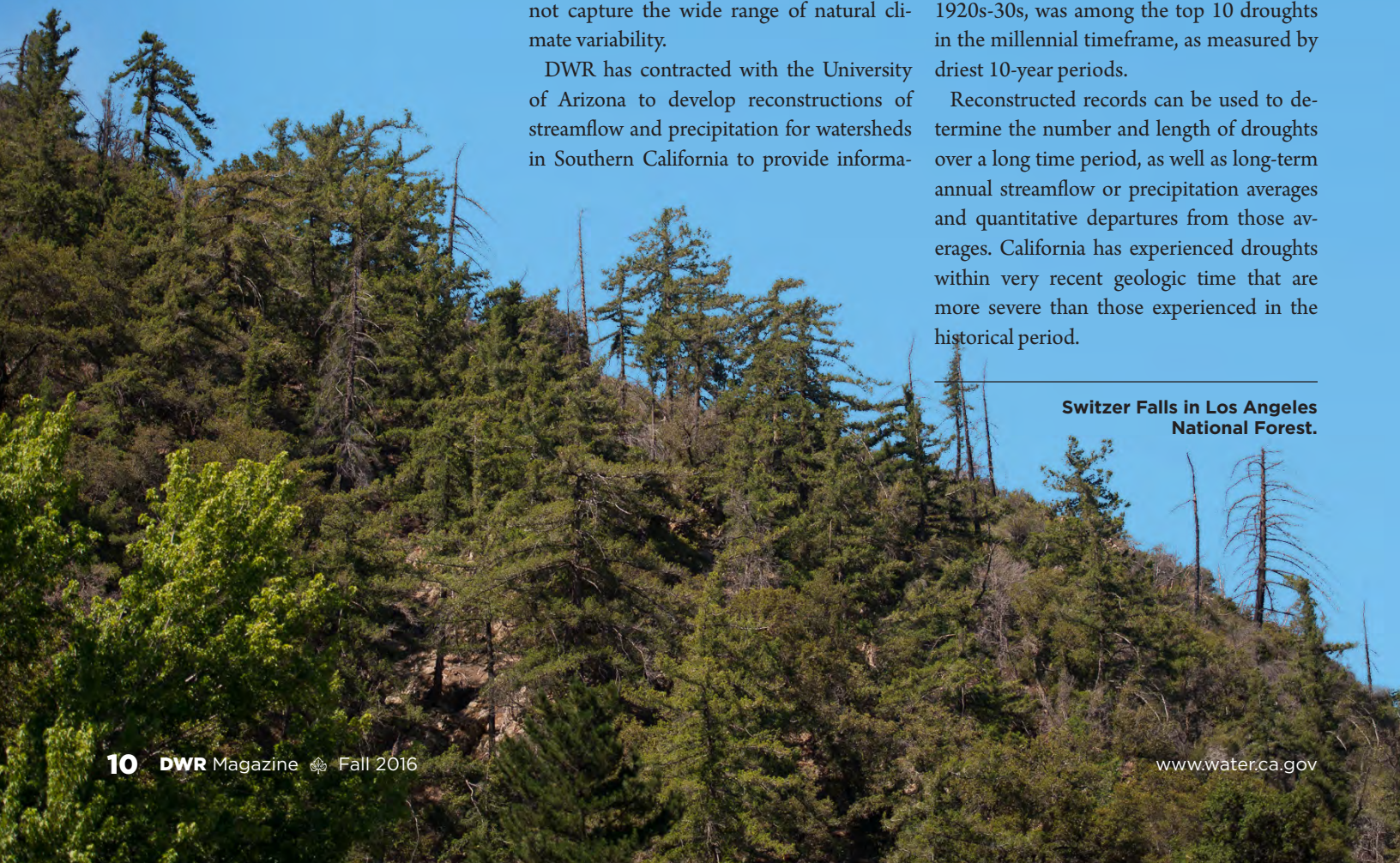
Executive Order B-37-16, issued this May, directs DWR to strengthen its requirements for UWMP preparation, adding a requirement to plan for at least a five-year drought. California has had five years of drought, and the scientific capability to correctly predict next year's water conditions does not currently exist. What are the odds that next year might be dry? How many long-duration droughts has the State experienced?

To answer these questions, we must turn to the paleoclimate record, since our brief period of measured hydrologic data does not capture the wide range of natural climate variability.

DWR has contracted with the University of Arizona to develop reconstructions of streamflow and precipitation for watersheds in Southern California to provide information for local water agencies to use in helping evaluate their drought risks.

The reconstructions, which are expected to go back as far as 1,000 years, will complement reconstructions DWR previously funded for the Sacramento and San Joaquin Rivers and their major tributaries. A finding of those reconstructions was that one event in our historical record, the prolonged off-and-on dry conditions during the 1920s-30s, was among the top 10 droughts in the millennial timeframe, as measured by driest 10-year periods.

Reconstructed records can be used to determine the number and length of droughts over a long time period, as well as long-term annual streamflow or precipitation averages and quantitative departures from those averages. California has experienced droughts within very recent geologic time that are more severe than those experienced in the historical period.



Switzer Falls in Los Angeles National Forest.

During North America's Medieval Warm Period, for example, arid conditions persisted for many decades, allowing trees to grow in locations now long submerged under alpine lakes in the Sierra Nevada. The Sacramento and San Joaquin River reconstructions also show another period when prolonged aridity occurred, from roughly the mid-1400s through the 1500s. A recurrence of similar hydrologic conditions in California today would be challenging for our present water management institutions and infrastructure.

Developing tree ring reconstructions of streamflow or precipitation entails collecting core samples from groups of long-lived moisture-sensitive tree species growing at sites of limited water availability, such as steeply sloping hillsides. Chainsaw samples may also be collected from relict wood (trees that have died in-situ) to extend the dating beyond the record available from living trees.

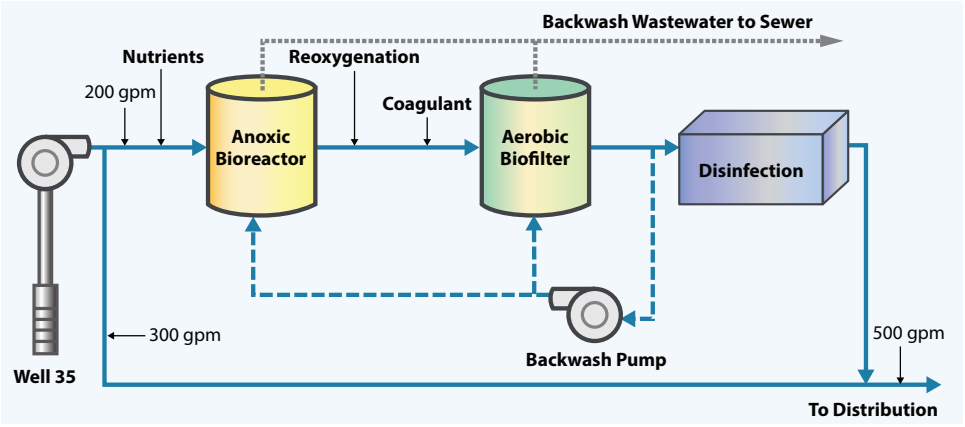
This sampling phase of the work was performed by the University of Arizona this summer on national forest lands in the Southern California mountains. The university has taken the samples back to its laboratory where they are mounted and sanded, annual rings are cross-dated and ring widths are measured under a microscope. Complex statistical modeling will then be performed using available historical streamflow or precipitation records to develop the reconstructed paleoclimate records.

As this work is being completed next year, a guidebook will be prepared for local water agencies to show how this information may be used in assessing drought risks and planning for drought resilience.

(Above-clockwise from left) Dave Meko, research professor from the University of Arizona's Laboratory of Tree-Ring Research, takes tree-ring sample at Switzer Falls on June 14, 2016. Tree-ring samples gathered from the Los Angeles, San Gabriel and other watersheds will help local water agencies to better assess drought risks in their service areas. DWR and University of Arizona researchers return from gathering tree-ring samples to get snapshots of as much as 1000 years of streamflow and precipitation data for Southern California watersheds.

DWR-Funded Project Provides Drinking Water

By Jennifer Iida



IMAGES COURTESY OF CAROLLO ENGINEERS

Providing safe drinking water is paramount to all communities. Four years ago when the City of Delano faced major drinking water contamination from nitrate, one of the country's most common groundwater contaminates, a DWR grant made it possible for the city to deliver safe drinking water.

"In May 2014, the City of Delano was awarded a $5 million grant from our Proposition 50, Chapter 6(b) Program," said Linda Ng, DWR Chief of the Financial Analysis and Risk Management Office. "This grant funded the completion of a three-year pilot study using a patented process to remove nitrate from drinking water."

The patented process is known as the biottta™ Well Head Treatment Demonstration Project.

"This process allows the City of Delano to keep Well 35, which was built in 2012, in production and to deliver safe drinking water to our citizens," said Roman Dowling, Delano Public Works Director/City Engineer. "A significant advantage to the process is that it destroys nitrate instead of concentrating it into a waste stream."

The city hired Carollo Engineers, Inc. in 2015 to install the biottta™ system, which led to statewide recognition for their team this year for receiving the three awards for engineering excellence, environmental sustainability and water project of the year:

- The American Council of Engineering Companies California, Honor Award for the 2016 Engineering Excellence.
- The American Academy of Environmental Engineers and Scientists, California, 2016 Grand Prize for Environmental Sustainability.
- The American Society of Civil Engineers Fresno, California Branch 2016 Water Project of the year.

The Carollo's Well Head Nitrate Treatment Demonstration Project process uses naturally-occurring bacteria to treat a range of contaminants.

The study showed the biottta™ treatment reduced nitrate to inactive nitrogen gas, proved the design plan and operating standards were possible and confirmed the minimal operating requirements and cost effectiveness of the system.

"This environmentally-friendly approach will save the city substantial waste disposal costs each year," said Dowling. "We hope that the demonstration facility and education center will help other communities that are dealing with similar groundwater challenges."

The State Water Resources Control Board supervised the project while DWR remained the sole funder of the project. The project consisted of a 10-month pilot study, the construction of a full scale biottta™ treatment facility and a 12-month treatment demonstration period.

"We are delighted that the City of Delano's innovative biottta™ system has successfully attained long-term economic benefits and sustainable safe drinking water to the City," said Perla Netto-Brown, who retired in July as Chief of the Division of Fiscal Services. "I am proud that DWR Fiscal Services was able to provide necessary funding for such an important and successful endeavor."

Located in the San Joaquin Valley in Kern County, the City of Delano is about 30 miles north-northwest of Bakersfield and is now piloting biottta™ at another well for chromium 6 treatment.

Innovations in Precipitation Observing and Forecasting

By Jeanine Jones, Interstate Resources Manager

Observing and forecasting precipitation is central to many aspects of water management – the time scales involved range from hours (flood risk management) to years (drought preparedness). DWR has invested heavily in innovative research, observations and projects related to extreme precipitation.

A theme running through this effort has been storms fueled by atmospheric rivers that make landfall in California. Atmospheric rivers are relatively narrow regions in the atmosphere that are responsible for conveying much of the water vapor outside the tropics. If one of these concentrated streams of moisture crosses the Pacific Ocean and reaches California, it can lead to significant flooding if meteorological conditions cause it to stall in one location. On average about 30 to 50 percent of the annual precipitation in the West Coast states is caused by these events, making them important contributors to water supply and potentially offering a key to drought prediction.

DWR's initial work on extreme precipitation with partners in the research community has resulted in major gains in the understanding of processes generating the state's largest precipitation events and is spawning a second generation of activities that apply this knowledge to applications. Four areas of current work are briefly outlined below. *DWR Magazine* will cover some of these activities in more detail in subsequent issues.

- **Hydrometeorology Testbed (HMT) and Enhanced Flood Response and Emergency Preparedness (EFREP) Programs**
  The National Oceanic and Atmospheric Administration's (NOAA) HMT program, DWR's EFREP program and the Scripps Institution of Oceanography have been collaborating in a program whose roots go back more than decade. DWR and NOAA have executed agreements for installation of an extensive, specialized statewide monitoring system for atmospheric rivers. The roughly $25 million State-federal investment in the instrumentation and related research has provided a foundation for further efforts to improve and apply new forecasting technologies.
- **Advanced Quantitative Precipitation Information (AQPI) Project**
  DWR recently awarded a $19 million Proposition 84 integrated regional water management grant for a Bay Area regional-scale atmospheric river observing network to help improve local stormwater and flood risk management. The work includes installation of weather radars and other monitoring equipment, plus modeling using the new observations to increase the accuracy of high-resolution precipitation and streamflow forecasts for water agencies and emergency responders.
- **Forecast-Informed Reservoir Operations (FIRO) Pilot Project**
  DWR is participating in a multi-agency research project for the U.S. Army Corps of Engineers' Lake Mendocino on the Russian River, a coastal river basin whose hydrology is strongly influenced by atmospheric river storms. The research will determine whether improved weather and hydrologic modeling and forecasts using new understanding and monitoring of atmospheric rivers could be used to operate the reservoir more efficiently, maintaining or improving flood operations performance while also allowing capture of additional streamflow for water supply purposes for Sonoma County Water Agency.
- **Sub-Seasonal to Seasonal Precipitation (S2S) Forecasting**
  The skill of present NOAA S2S precipitation outlooks – predictions of precipitation extending beyond the two-week timeframe of weather models out to several weeks (sub-seasonal) or to a winter season – is now only slightly better than chance. Improving forecasting skill is scientifically challenging but would be hugely useful for water supply management and drought preparedness.

DWR is working with the Western States Water Council, NOAA and Scripps to identify and pursue the most promising research strategies. Developing predictive capability for atmospheric rivers offers obvious prospects for improving forecasting skill.

A Voice

By Anecita Agustinez, DWR's Tribal Policy Advisor

Tribal Communication and Outreach Part of Implementation of DWR's Sustainable Groundwater Management Program

Anecita Agustinez, DWR's Tribal Policy Advisor, explains goals of annual Tribal Government workshop in Sacramento to participants and DWR Tribal regional office liaisons, including Tito Cervantes (left) of Northern Region Office.

The goals of successful implementation of the Sustainable Groundwater Management Act (SGMA) are directly tied to effective communication and outreach. This includes coordination at all levels of government, including building and strengthening relationships with California's Tribal Governments.

After the passage of the historic SGMA legislation, DWR's Tribal Policy Advisor outlined a communication and outreach framework for Tribal Governments in early 2015. The purpose was to ensure the inclusion of tribal engagement and communication in the Draft Strategic Plan for DWR's Sustainable Groundwater Management Program and other subsequent regulatory actions involved in the implementation strategy.

SGMA provides that the federal government or any federally recognized Indian Tribe may voluntarily agree to participate with local agencies in the coordination of groundwater management in the basin. The vehicle to do this would be a joint powers authority or other agreement with local agencies in the basin.

Although SGMA specifically refers to federally recognized Tribes, Governor Brown's Executive Order B-10-11 states that California Native American Tribes include both federally and non-federally recognized Tribes.

There are more than 566 Native American Tribes in the United States and California is home to 109 federally recognized Tribes, the largest population in the country. There are also more than 60 non-federally recognized Tribes which have an important relationship with California and its governmental agencies. As sovereign nations, California's Native American Tribes hold a unique position in government relations. Tribes are accustomed to consultation at the highest levels of government, unparalleled to traditional stakeholder involvement.

Tribes and local agencies have a shared interest in sustainable groundwater management. Communication and outreach, along with collaboration, is critical to achieving sustainability. DWR's Tribal Policy Advisor, Anecita Agustinez, with assistance from the regional office tribal liaisons Emily Alejandrino, Tito Cervantes, Christa Collin, Siran Erysian, Tim Nelson, Mary Randall and Jennifer Wong, have been responsible for strategizing the coordination of SGMA implementation and developing key messaging points for Tribal Governments.

To facilitate coordinated communication and outreach about SGMA, DWR created a Tribal Advisory Group (TAG). TAG membership includes tribal representatives from the Northern, Central and Southern California regions, reflecting the diverse viewpoints of tribal governments statewide. In addition to informing tribal governments and communities about SGMA implementation and outcomes, TAG also served to increase the sharing and integration of tribal perspectives in the implementation phase.

TAG also provides a conduit to assist DWR in educating non-tribal governments and communities about tribal groundwater issues, with the goals of tribal inclusion and engagement in groundwater management planning throughout California. Among the early engagement tools that TAG created were factsheets defining terminology in SGMA, including the definition of Tribal

Timothy Godwin of DWR explains the groundwater sustainability agency formation and engagement.

Dan McManus of DWR (second to right) presents SGMA Program activities to Thomas Peltier of State Water Resources Control Board, Aaron Dixon of Susanville Indian Rancheria and Mary Randall of DWR.

Craig Cross of DWR provides an update on Proposition 1 grants administered through DWR.

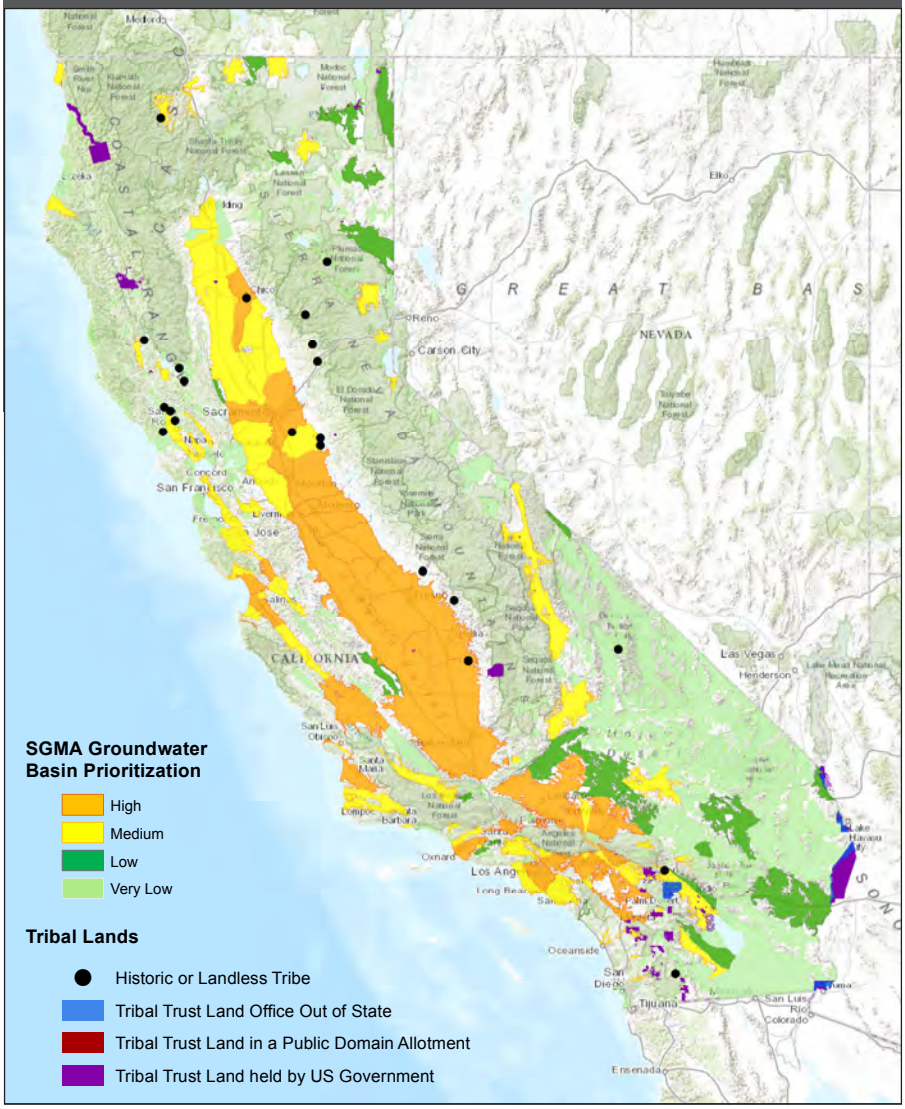
Law and a land primer to assist local agencies on the types of land held by Tribes. These documents are critical tools that will be used by the local agencies seeking to form a groundwater sustainability agency.

DWR has continued its outreach efforts by meeting one-on-one with Tribes and convening annual meetings. More information can be found at **www.water.ca.gov/tribal**. As part of DWR's efforts to encourage collaboration, this year's regional meetings were open to Tribes and local agencies. This forum provided an opportunity for everyone to discuss their shared goals of reaching sustainability and take the first steps in achieving that goal through effective communication between Tribes and local agencies.

Many Tribes have groundwater management plans for tribal lands and conduct periodic monitoring of their surface and groundwater. This information is a critical piece of effective groundwater management. Ongoing tribal engagement and encouraging tribal and local agency collaboration strengthens relationships and brings positive change by ensuring all perspectives are shared at the table especially as it relates to achieving sustainability.

With thorough engagement, consultation and outreach with tribal governments, DWR continues to make strides towards its SGMA implementation goals. It is imperative that tribal governments have a voice in the implementation process as sustainability can only be achieved working together.

CASGEM Groundwater Basin Prioritization and Tribal Lands of California



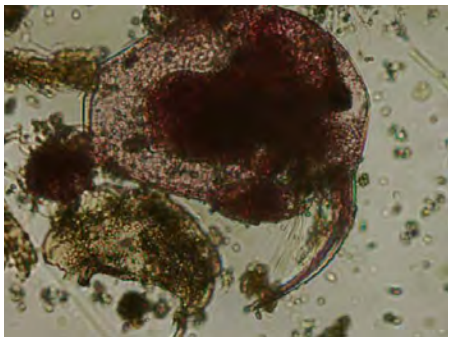
Flow Creates Bloom

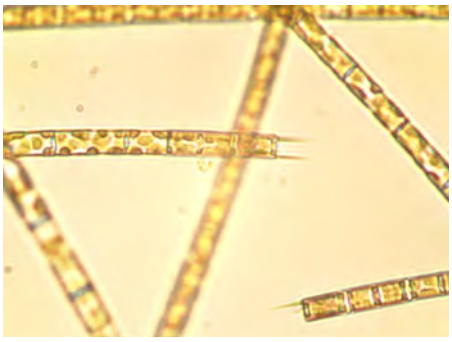
By Doug Carlson

DWR Scientists' Experiment Boosts Food Supply for Delta Smelt

When California designated the Golden Trout as the state freshwater fish in 1947, millions of Delta smelt thrived in relative obscurity where the waters of the Sacramento and San Joaquin rivers meet.

In the decades since, the finger-length little fish with a funny name has become more famous than the Golden Trout ever was. Many factors including reduced water quality, predation by invasive species, lower inflows during drought and a diminished habitat have combined to push the species to the brink of extinction.





Photos by DWR Division of Environmental Services' Aquatic Ecology Section of local zooplankton (left) and common phytoplankton from the Yolo Bypass.

To help save the severely diminished Delta smelt population from that fate, the State Water Project and the federal Central Valley Project have frequently curtailed pump operations in the south Delta and reduce water exports to other regions.

State and federal partners – DWR, the California Department of Fish and Wildlife, Division of Boating and Waterways, the U.S. Fish and Wildlife Service and the U.S. Bureau of Reclamation, launched a Delta Smelt Resiliency Strategy this summer to aggressively pursue actions that will benefit the species and stem its decline. Among the plan's goals is an increase in food resources for the fish.

Division of Environmental Services (DES) scientists have identified a promising approach to do that by boosting the growth of phytoplankton, the "green stuff" that is eaten by zooplankton (tiny shrimp) that are food for the smelt and many other fishes.

DWR Lead Scientist Dr. Ted Sommer said DES observations over the past 30 years revealed that phytoplankton blooms in the

Delta are increasingly rare. Moreover, the Sacramento River supplies little phytoplankton to seed the Delta. "Plankton does best in relatively slow-moving shallow water, but the river is dark and deep, and the water runs swiftly," he said. "That's good for moving flood waters, but not so good for plankton growth."

The one time in recent years that plankton blooms were prominent during drier months was in fall 2011-12 after water was allowed to flow through the Colusa Basin Drain and the Yolo Bypass, a floodplain wetland complex adjacent to the Sacramento River. The agricultural return flows mixed and transported phytoplankton within local and downstream tidal channels that began growing in those flows and eventually "seeded" blooms in the lower Sacramento River.

Sommer said DES Environmental Scientist Jared Frantzich deserves a lot of the credit for observations that support the idea the blooms he observed five years ago – the first fall plankton blooms in 20 years – might be achieved in dry conditions by pulsing water through the Yolo Bypass again.

"Our group has been monitoring the benefits that seasonal floodplain habitat in the Yolo Bypass provides for the food web and fish in the Delta for more than 15 years," Frantzich said. "We decided to look at the food web all year long, not just during flooding events in the winter and spring, to see how the Bypass may also be a donor habitat for the downstream food web in other times of the year."

DES proposed a diversion into the Bypass this summer, and the experiment was a success when blooms occurred downstream in the Delta. The new Resiliency Strategy encouraged State and federal agencies and local water districts to cooperate in an unprecedented fashion.

"We were able to make a convincing argument that it was worth releasing more water this summer," Sommer said. "It was extremely satisfying. This is a cool story," he concluded, "with lots of moving parts."

DWR Director Mark Cowin (left of podium) and Lead Scientist Ted Sommer (at podium) at the Yolo Bypass in August 2016 gather with State and federal leaders to unveil the initial results of the flow action, which is a key part of the Delta Smelt Resiliency Strategy.

Better Odds of Survival

Sherman Island Fish Release Sites' Construction Underway

By Christina Jimenez

Construction kicked off in summer of 2016 for DWR's two new fish release sites on the northwest side of Sherman Island near Rio Vista.

Approximately 40 years have passed since DWR built a fish release site. Curtis Landing and Horseshoe Bend were constructed in the early 1970's.

Expected to wrap up December of 2017, construction of the two sites is part of DWR's commitment to reduce predation and improve overall survival of fish salvaged from the John E. Skinner Fish Protective Facility released back into Delta waters when the Banks Pumping Plant pumps are operating.

DWR's Bay Delta Office, Delta Field Division, Division of Engineering, Division of Environmental Services and the United States Bureau of Reclamation (Reclamation) have worked cooperatively to reduce loss of protected species to predators at the fish release sites and to increase salvaged fish survival rates, mandated by the 2009 National Marine and Fisheries Services (NMFS) Biological Opinion.

"Based on Release Site Studies conducted in 2007-2008, building two new release sites to increase time between releases at each site is a key part of our plan to meet the requirements of the 2009 NMFS Biological Opinion," said Kathleen Buchnoff, Bay-Delta Office Senior Engineer. "Making the improvements to existing release sites and a randomized release schedule that incorporates both the State Water Project and Central Valley Project releases are also essential to reduce predation at the end of the release pipe."

The new sites along the Sacramento River – Manzo Ranch and Little Baja – are approximately a half mile apart and will bring the total number of Delta fish release sites to

(Above) Installation of steel pipe for fish release site. (Left) Chief Paul Marshall and Senior Engineer Kathleen Buchnoff of the Bay-Delta Office visit fish release site under construction during the unloading of soil material. Engineer Yaling Liu (center) discusses the Sherman Island fish release site project with the staff.

(Clockwise from left) Environmental Scientist Analisa Martinez takes water samples and (right) monitors water quality during construction. DWR Construction Inspector Robert Logan (center) reviews the Sherman Island fish release site project with contractors. Engineer Adil Shaw of the Bay-Delta Office checks material at the project site. Levee improvements are part of the project.

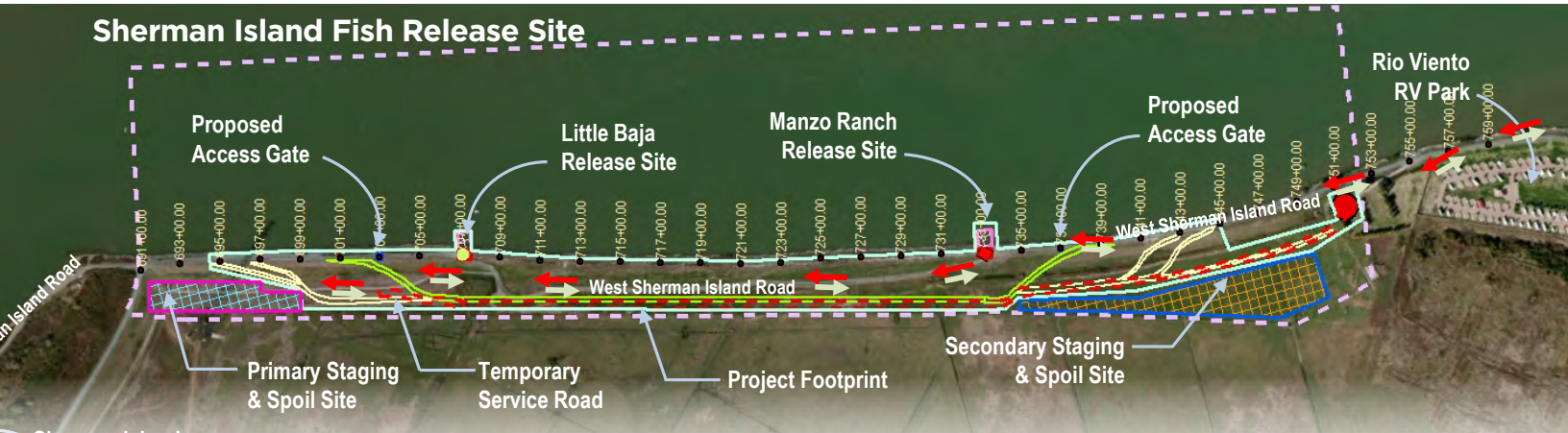
six. Of these locations, DWR owns four sites and Reclamation owns two sites. Currently, DWR fish releases are alternated between the two existing sites, Curtis Landing and Horseshoe Bend.

Each of DWR's two new sites will include a new fish release system with pumps, a screened intake pipe and a pipe to release the fish back into the Delta.

Automated gates for county road site access, asphalt concrete paving on the levee, operation pads, site lighting, downspouts, electrical upgrades and security fencing and gates will also be constructed at both sites.

Improvements to the levee and county road realignments will also be made at the sites by Reclamation District 341 in coordination with the Bay-Delta Office and the Delta Levees Office. Total project cost is estimated at 21.5 million dollars.

After construction, DWR will begin a three-year monitoring study through 2020 to evaluate effectiveness of the fish release sites, analyze salvaged fish survival rates with sonar, and mark and recapture methods.



Strengthening the Delta Ecosystem to Save Fish

Yolo Bypass Biological Opinion Projects

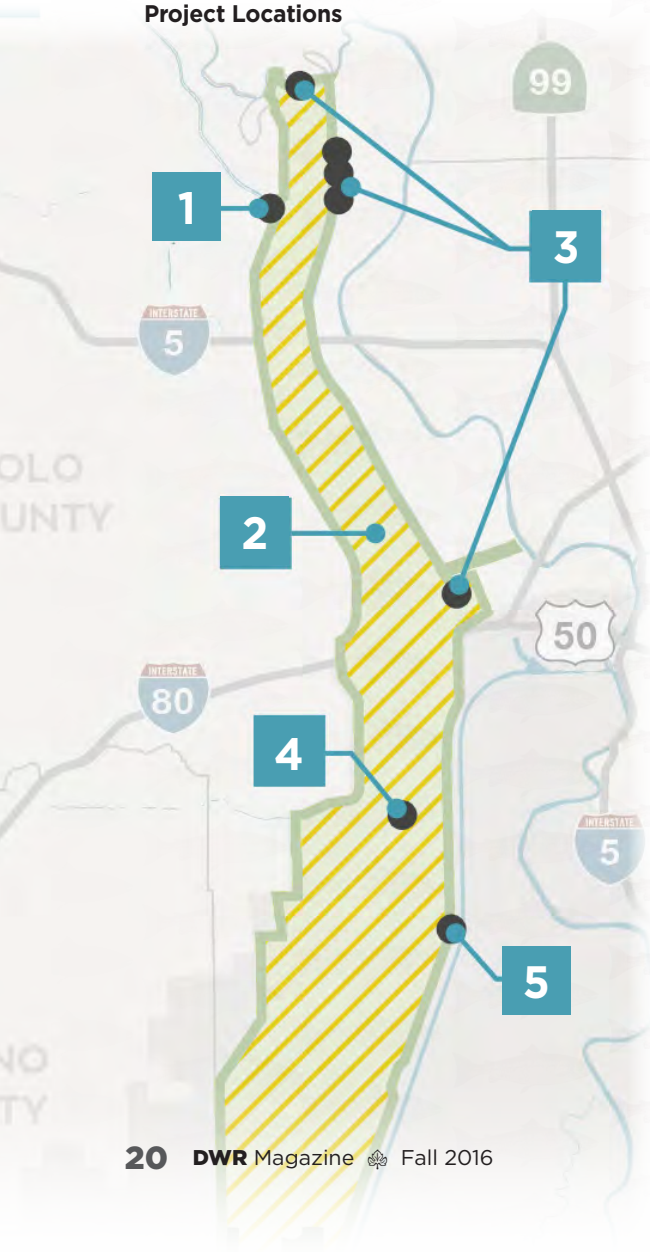
By Jennifer Iida

Protection of four federally listed fish species lies in the capable hands of a DWR team ramping up to further its work on a series of habitat restoration projects.

"DWR's Division of Environmental Services is working in collaboration with the Bureau of Reclamation (Reclamation) on projects required under the 2009 National Marine Fisheries Service's (NMFS) Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project (NMFS BiOp)," said Karen Enstrom, Chief, Division of Environmental Service's Yolo Bypass Habitat Restoration Branch.

The 2009 NMFS BiOp found that continued water project operations were likely to jeopardize the existence of four federal-

Project Locations



1 Wallace Weir Fish Rescue Facility Project

To help protect migrating Chinook salmon and green sturgeon from harm, a permanent structure will replace the earthen Wallace Weir Fish Barrier. Irrigation discharge and storm runoff through this weir attracts fish to stray from the Yolo Bypass into the Colusa Basin Drain (CBD), where they become stranded and unlikely to return to the Sacramento River.

With the improved permanent structure, migratory fish will be blocked from entering the CBD over a broad range of flows. A fish collection facility is also planned to allow for efficient fish trapping and relocation to the Sacramento River.

DWR has been working with Reclamation District 108 to plan and permit this project. The District released an Initial Study and Mitigated Negative Declaration in April 2016. Permitting is complete, and construction started in August 2016.

DWR Director Mark Cowin speaks about the start of construction for Wallace Weir project.

ly-listed fish species that include Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead and Southern Distinct Population Segment of North American green sturgeon. The BiOp requires DWR and Reclamation to complete several projects, including habitat restoration and fish passage improvements in the Yolo Bypass.

"These projects are also included in California's EcoRestore initiative, a larger program covering restoration projects throughout the Sacramento-San Joaquin Delta," Enstrom said.

The status of current projects is as follows.

2 The Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project

The Yolo Bypass serves as the largest remaining floodplain in the Sacramento Valley, yet it is only accessible to young salmon when the Sacramento River stage exceeds the crest of the Fremont Weir during high-flow events. Dams and levees have long altered or blocked usage of most salmon floodplain-rearing habitat in the Sacramento Valley.

The Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project will construct a gated primary fish passage and juvenile fish entrainment (carry along in a current) structure in Fremont Weir. A notch in the structure will increase the flows during natural flooding events. This increase will be managed to avoid or minimize effects on farmers' planting time. The increased flow will help young salmon feed in a nutrient-dense environment to grow strong and survive before heading out to the ocean.

DWR is working collaboratively with area landowners and governments to plan the project. Construction is anticipated to begin by 2021.

3 Fremont Weir Adult Fish Passage Modification Project

A larger and deeper fish passage structure is needed at the Fremont Weir in order for adult Chinook salmon and green sturgeon to re-enter the Sacramento River. For now, they must swim over Fremont Weir or through a small fish ladder near the center of the long weir, which is difficult for the fish to find.

This project will modify the existing Fremont Weir Fish Ladder and, until the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project is implemented, will improve fish passage for adult salmon and green sturgeon.

Other potential barriers also exist for the migratory fish in the form of agricultural road crossings over the Tule Canal in the northern Yolo Bypass.

This project would include removing two road crossings that are no longer used and replace two crossings with bridges or large fish-friendly box culverts to allow for clear passage of migratory fish.

DWR and Reclamation are working closely with landowners to ensure the project's goals are met and current agricultural practices may continue. Construction is scheduled for 2017.

4 Lower Putah Creek Restoration Project

A small run of Chinook salmon spawns in the creek in wetter years when adult fish that reach the Cache Slough area of the Sacramento River swim up the Toe Drain along the east levee of the Yolo Bypass and find their way into Putah Creek. Putah Creek flows from the inner Coast Range to the Yolo Bypass, where it becomes a straightened ditch used mainly for irrigation.

The proposed project will create a new creek channel that will improve fish passage and native fish habitat, including seasonally flooded wetlands. The project will connect Putah Creek with previously restored tidal channels along the Toe Drain and will widen and enhance those channels. This will create tidal habitat and provide better passage for salmon. The project will improve fish passage to and from spawning grounds on upper Putah Creek by installing a structure that will better control the seasonal timing and magnitude of creek flows.

The California Department of Fish and Wildlife (CDFW) led the planning effort for this project on CDFW property on the Yolo Bypass Wildlife Area. After the public draft California Environmental Quality Act document is released, DWR will assume responsibility for the project in late 2016. The target date for construction is 2018.

Fremont Weir

5 Lisbon Weir Fish Passage Improvement

Lisbon Weir modifications will be a significant upgrade for adult migrating fish. Lisbon Weir currently delays migration in the Yolo Bypass. When the bypass is not flooded, salmon and sturgeon can only pass this rock weir when flood tides open a small section of flap gate or when a strong high tide overtops the weir.

This modification project would improve fish passage throughout the tidal cycle while maintaining a reliable agricultural diversion.

Planning for this project is currently at the conceptual design level. The target date for project implementation is 2018.

Visit http://www.water.ca.gov/environmentalservices/yolo_bypass_salmonid.cfm for more information.

DWR Encounters Endangered Giant Garter Snakes on Delta Islands

Snakes Spotted

By Jennifer Iida

A snake slithering across a levee road may seem insignificant. To a DWR engineer or environmental scientist, this is no ordinary encounter. These moments are filled with joy as the engineer and scientist document the sightings of a threatened species. The giant garter snake was spotted three times in April 2016 on Sherman Island and Twitchell Island and once in May on Twitchell Island.

"We were excited, to say the least!" said Jim Long, Senior Environmental Scientist in the Division of Integrated Regional Water Management's Environmental Restoration and Enhancement Branch. "These observations are adding to the growing list of data illustrating the wildlife benefits of Delta Levees Program's habitat restoration and enhancement efforts in the west Delta."

Past field surveys performed throughout the Delta failed to demonstrate the presence of the snakes in most of its former range.

These recent observations were documented adjacent to three DWR-funded and developed habitat sites of Whale's Mouth Wetland Restoration and Scour Pond Habitat Enhancement Project, Sherman Island Habitat Setback Levee and Twitchell East End Wetland Restoration Project.

(Left to Right) Jim Long, Senior Environmental Scientist of the Delta Ecosystem Enhancement Section and Bryan Brock, Chief of West Delta Program at Twitchell Island, where giant garter snakes were spotted.

"The Department has recently been working with several environmental regulatory agencies trying to set up a DWR Self-Serve Mitigation Site on Twitchell Island," said Bryan Brock, Senior Engineer and Chief of the West Delta Program. "This would allow giant garter snake habitat impacts in the Delta to be mitigated by DWR on land that is owned by DWR and critical to the protection of the State Water Project."

Its designation would save the Department millions of dollars in mitigation costs related to routine maintenance and construction of fish-friendly habitat restoration projects, like the Prospect Island Tidal Habitat Restoration Project.

"We are also in early planning for establishing a safe harbor agreement for the giant garter snake on Twitchell and Sherman islands to protect our future ongoing maintenance activities from an incidental taking of snakes," said Long.

The development of habitat projects at multiple sites around Twitchell Island are underway. Sites include the Twitchell Island Habitat Enhancement Project and the start of the Twitchell Island Channel Margin Habitat Project along the San Joaquin River levee that would eventually extend the existing Twitchell Island Habitat Setback Levee four miles upriver to Seven Mile Slough.

"As it turns out, building wetlands is a critical component to snakes habitat," according to Brock. "Needless to say, the regulatory agencies are excited about potentially developing these sites for mitigation purposes, and the Department is equally excited as these multi-purpose habitat projects not only provide excellent habitat for many species but also mitigate greenhouse gas and subsidence impacts."

Native to California, the giant garter snake feeds primarily on fish, frogs and tadpoles. They are usually active from spring until fall and have historically been found from Kern County north along the Central Valley to Butte County, with a gap in the central part of the valley.

For more giant garter snake information, visit https://www.fws.gov/sacramento/es_species/Accounts/Amphibians-Reptiles/es_giant-garter-snake.htm

Calaveras Dam Spillway Complete

By Doug Carlson

The construction of the Calaveras Dam Replacement Project in the East Bay's Sunol Valley is so vast and so remarkably major that it's probably beyond the ability of most people to visualize.

The project is massive, gigantic, huge. Whatever adjective you choose will still not convey the reality of just how big this dam project truly is.

Going to the site to observe the construction in progress is possible for only a few people. The time-lapse video at http://bit.ly/2aEhVdR gives an idea of the arc of the project.

It's from the YouTube channel of the San Francisco Public Utilities Commission, owner of Calaveras Dam. Shot over a four-year span, the video shows the extraordinary transformation of the land just downstream of the earth-fill dam, which was built in 1925 as a replacement for an earlier dam at that location that collapsed in 1918.

Collapse is a bad word in dam circles. Once a threat is detected that might cause major damage, owners are prepared to move heaven and earth to minimize or eliminate the threat.

With the spillway completed, the Calaveras Dam replacement project is now more than 70 percent complete. Chief David Gutierrez (right) and Engineer Alvin Prakash of the Division of Safety of Dam inspect Calaveras Dam construction site.

The existence of the Calaveras earthquake fault just 1,500 feet from the dam is what prompted the Calaveras Dam replacement.

To date, more than seven million cubic yards of rock and dirt have been moved during the project. (See *DWR Magazine's* Winter 2014-15 issue for details on all three Calaveras dams: http://bit.ly/2aF8afq)

DWR's Division of Safety of Dams (DSOD) is responsible for ensuring safe and sound construction of the new Calaveras Dam. Russ Bowlus, a Supervising Engineer within DSOD, described the Division's role:

"We are the third party that's not focused on the schedule and budget," he said. "We're interested in a high-quality final product."

A major milestone was reached early in 2016 with the completion of the dam's spillway. A local media report called it "a massive concrete channel as wide as eight lanes of freeway and a quarter mile long." It's the structure that seemingly springs up out of nowhere near the end of the time-lapse video.

In addition to finishing off the spillway, other accomplishments this year include the foundation grouting, the new outlet pipe and the foundation excavation for the embankment.

The major feature that remains to be built is the dam itself. The entire replacement project is scheduled for completion in 2018. Looking ahead to that goal, it would be remarkable if the new Calaveras Dam were dedicated on March 24, exactly 100 years to the day since the original structure collapsed.

Milestone Achieved

South State Water Project Hydropower Facilities Relicensing Team Submits Initial Documents

By Jeff Parsons, Senior Engineer, Hydropower License Planning and Compliance Office

On August 1, 2016, a major milestone for the relicensing process was reached – the Preliminary Application Documents (PAD) for South State Water Project (SWP) Hydropower were submitted to the Federal Energy Regulatory Commission (FERC) in an effort led by the Hydropower License Planning and Compliance Office (HLPCO) in close coordination with the Division of Operations and Maintenance's (O&M) Southern Field Division (SFD).

Years of preparation have gone into the relicensing effort for South SWP Hydropower, known as FERC Project No. 2426.

HLPCO is responsible for overseeing compliance with DWR's three FERC hydropower licenses, two conduit exemptions and managing FERC relicensing activities. FERC ensures that licensed projects comply with terms and conditions related to public safety, recreation, operational reliability, dam safety, water and energy supply and environmental and cultural resources.

According to Ted Craddock, Chief of HLPCO, the current license for P-2426 is scheduled to expire in 2022 and relicensing is required to continue realizing the numerous benefits of the project. From 2011 to 2015, the project's hydropower generation offset an average of 25 percent of the net pumping load required for the SWP, which is the largest State-owned and operated water supply project of its kind in the United States.

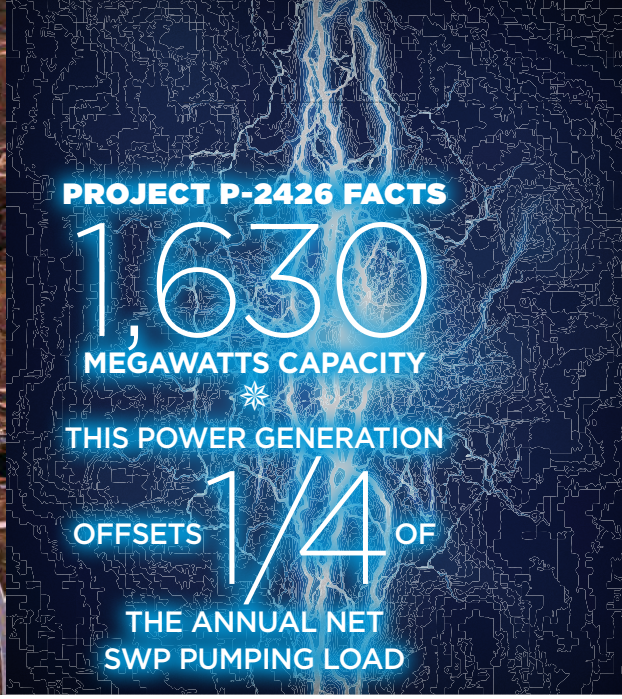
The South SWP Hydropower provides California with many benefits, including an affordable water supply, reliable clean hydropower, opportunities to integrate green energy, public recreation opportunities and environmental benefits.

The P-2426 project, described by Bonnie Duecker, Branch Chief of SFD's License Coordination Branch, is located in SFD, and encompasses 10,672 acres and has two branches:

1. The South SWP Hydropower Project, operating on the West Branch with a 1,350 megawatt power capability, includes Quail Lake, Lower Quail Canal, Peace Valley Pipeline Intake Embankment, Quail Detention Embankment, Peace Valley Pipeline, Gorman Bypass Channel, William E. Warne Powerplant, Warne Transmission Line, Pyramid Dam, Pyramid Lake, Angeles Tunnel and Penstocks, Castaic Powerplant, Elderberry Forebay Dam, Elderberry Forebay, Castaic Transmission Line and recreational facilities at Quail Lake and Pyramid Lake.

2. The Devil Canyon Project, operating on the East Branch with a 280-megawatt power capability, includes Cedar Springs Dam, Silverwood Lake, San Bernardino Tunnel intake, San Bernardino Tunnel and Penstocks, Devil Canyon

HLPCO team includes counter-clockwise (Top left) Jeff Parsons, Sue Larsen, Sherida Schouweiler, Ted Craddock, Gwen Scholl, Earl Nelson, Richard Sandoval, Aaron S. Miller, James Gleim, James Cox, Scott Goebl, Lisa Lee, Molly White.



Above: **Cedar Springs Dam, a license facility, forms Silverwood Lake, which is the highest State Water Project reservoir in Southern California and serves as the forebay to Devil Canyon Powerplant.**
Below: **The water stored at Pyramid Lake, a license facility, generates hydroelectric power and provides a wide variety of recreational opportunities to the public.**

Powerplant and Switchyard, Devil Canyon Afterbay, Devil Canyon Second Afterbay and recreational facilities at Silverwood Lake.

The Los Angeles Department of Water and Power (LADWP) is currently DWR's joint licensee for P-26 to the extent of LADWP's interest in the Castaic pumping-generating facilities, which LADWP operates through a cooperative agreement with DWR. DWR and LADWP are requesting that at the completion of relicensing, FERC issue one new license to DWR for the East Branch facilities and one new license to DWR and LADWP as co-licensees for the West Branch facilities.

Separated geographically by 100 miles, the East and West branches have vastly different relicensing needs pertaining to environmental, recreational, local and tribal government, stakeholder and general public concerns. Splitting the license is more efficient for scope, cost and time for DWR and LADWP.

Recent completion of the PADs was a major milestone for P-2426's relicensing process. The PAD review process led by HLPCO involved input from O&M, SFD, Division of Engineering, Division of Environmental Services, SWP Analysis Office and SWP Power and Risk Office. The PAD provides FERC, federal and State agencies, Native American tribes, local governments, non-governmental organizations, businesses, members of the public and other interested parties with existing, relevant, and reasonably available information related to the Project and potentially affected resources. The PAD presents DWR's proposal for gathering additional information to meet the new license's requirements.

There will be many challenging tasks to complete in the years ahead throughout the relicensing schedule. Studies will need to be performed to augment existing environmental, recreational, cultural and tribal resources information. Outreach discussions will be held with FERC and stakeholders regarding the study recommendations. The final filing of the license will be accompanied by these environmental activities: Biological Assessments, National Environmental Policy Act, California Environmental Quality Act and State Water Resources Control Board 401 certification.

"HLPCO's relicensing goal is to obtain a new license for SWP power operations to provide safe and cost-effective operation of licensed facilities while protecting P-2426 water supply and power generation functions and addressing project impacts in an accountable and responsive manner," said Gwen Scholl, P-2426 Relicensing Program Manager.

Getting to 20 by 18

DWR Reduces Energy and Water Use at Facilities

By Akiela Moses

As part of DWR's Strategic Climate Plan, the Department is conserving water, energy and reducing greenhouse gas (GHG) emissions at its many facilities located throughout the State.

With Executive Orders B-18-12 (2012) and B-29-15 (2015), Governor Edmund G. Brown Jr. directed all State agencies to reduce their GHG emissions, water and energy usage by 20 percent. DWR has implemented various programs and steps to meet the Governor's mandate and is currently ranked as one of the top agencies on the CA Sustainable Buildings website.

DWR has reduced its energy usage by 8.1 percent from 2003-2015. Water usage dropped by 65.5 percent from 2010 to 2015 and 40.2 percent from 2013-2015.

"Natural resource management is a crucial part of DWR's mission, and it is important for the Department to lead by example among other agencies," said Stuart Chan, Chief of DWR's Water and Energy Efficiency Branch.

Following the 2012 Executive Order, the Department analyzed DWR facilities with the highest electrical and water usage and determined which buildings held the highest potential for use reduction.

This analysis led to a series of energy and water efficiency projects being implemented at multiple buildings, including the Coalinga Operations and Maintenance (O&M) Subcenter, Sutter Maintenance Yard, Oroville Field Division Headquarters and Lost Hills O&M Subcenter. To reduce water use, State

Stuart Chan, Chief of DWR's Water and Energy Efficiency Section, holds an LED bulb (top) that uses 17 watts of power and an efficient T-8 fluorescent bulb that uses 28 watts. By upgrading to LED bulbs instead of T-8s, DWR saves 315 kWh and $50 per fixture per year.

Jason Newton, Hydroelectric Plant Electrician at Oroville Field Division, inspects the mounting around the light fixture at Oroville Field Division Headquarters.

Water Project Field Divisions and Flood Maintenance sites installed low-flow toilets, waterless urinals, low-flow sink aerators and drought-tolerant plants. To save energy, DWR replaced traditional lights with light-emitting diodes or "LEDs," which are energy efficient and also provide buildings with better lighting.

"My branch is also currently working on two new solar projects scheduled for construction in 2017," Chan said. "DWR has made significant progress, but we have a long way to go in meeting the Governor's energy reduction requirements."

The projects involve building solar systems at the Oroville Field Division Headquarters and at the Lost Hills O&M Subcenter. These projects are expected to generate clean renewable energy while also reducing DWR's retail energy use by 12 percent. Combined with DWR's current 8.1 percent reduction, this project would help put the Department on track to meet the required 20 percent reduction by 2018.

DWR's strategic plan for climate change identifies ways the Department can best adapt to California's continuously changing conditions without increasing its impact on the environment. To achieve this, a series of programs focused on managing GHG emissions has been implemented and set as one of DWR's main focuses.

In addition to increasing energy and water efficiency, DWR is reducing its GHG emissions and dependency on fossil fuel. DWR adopted a Greenhouse Gas Emissions Reduction Plan in 2012 to reduce its GHG emissions by 50 percent below 1990 levels by 2020 and 80 percent by 2050.

These efforts are just a glimpse into all that DWR has done in recent years to both preserve and improve California's natural environment. There are several other energy-related EO B-18-12 mandates that DWR is also striving to achieve, including installing electric vehicle charging stations at DWR facilities, making 50 percent of DWR's existing building square footage Zero Net Energy by 2025 and participating in Demand Response Energy Reduction programs.

DWR Facilities Reducing Energy Use

Facility Location	Utility Area	2003 Electricity Usage (MWh)	2014 Electricity Usage (MWh)	Estimated Energy Savings (MWh/yr)	Project Cost	Installation Completed
Oroville Field Division Headquarters	PG&E	1,325	1,224	113	$55,734	10/14/2015
Lost Hills Sub Center	PG&E	705	425	74	$44,294	8/21/2015
Coalinga Sub Center	PG&E	330	222	83	$31,349	12/7/2015
Sutter Maintenance Yard	PG&E	131	141*	71	$34,696	7/23/2014

* Increase due to new building

SUSTAINABLE BUILDINGS

Not all DWR facilities are represented in the data included on the Governor's website because water and energy usage data of leased buildings are not available or the buildings are managed by other State agencies, such as the Department of General Services. DWR buildings included in the Governor's website are:

- **Beckworth Subcenter**
- **Cedar Springs Dam Maintenance Subcenter**
- **Coalinga Operations and Maintenance Subcenter**
- **Delta Operations and Maintenance Center**
- **Lost Hills Operations and Maintenance Subcenter**
- **North Bay Maintenance Center**
- **Oroville Operations and Maintenance Center**
- **Romero Overlook Visitors Center**
- **Sacramento Maintenance Yard**
- **San Joaquin Operations and Maintenance Center**
- **Southern California Operations and Maintenance Center**
- **Storage Yard (West Sacramento)**
- **Sutter Maintenance Yard**
- **Tehachapi East Afterbay Laboratory**
- **Thermalito Annex Building**
- **Vista Del Lago Visitors Center**
- **Water Operations Building**
- **Water Quality Test Building**

To view a listing of California State Agencies' Sustainable Buildings published by the Governor's office, visit **http://www.greenbuildings.ca.gov**

Showcasing the Value of State-Federal Cooperation

By Kelly Briggs, Environmental Program Manager in the Division of Flood Management

California is at its best when people come together in the face of adversity to solve difficult problems. Only by working together can we improve and sustain the state's water future for generations to come.

—Governor Brown's CA Water Action Plan

The Governor's Water Action Plan is a call to action to organizations responsible for water resources management in California. The Action Plan states "Successful implementation will require increased collaboration between state, federal and local governments, regional agencies, tribal governments and the public and private sector."

At DWR, we are reaching across organizational lines, internally and externally, vertically and horizontally, to cultivate and maintain robust partnerships. A foundational first step is taking the time to understand one another's needs, goals and processes. We have made great strides in this area with our U.S. Army Corps of Engineers (Corps) partner. This year DWR worked with the Corps Sacramento District to host a custom-tailored Regulatory Program Workshop series in the Resources Building auditorium. The three workshops were designed to educate and support DWR staff in successfully navigating complex federal regulatory requirements in the delivery of their programs and projects.

"We developed the basic content for these workshops from our quarterly public workshops that explain the Corps' regulatory process," said Nancy Haley, Chief of the Northern California regulatory branch for the Corps Sacramento District. "Several representatives of our Corps operations division also took part in the workshops, which expanded the perspective on issues challenging DWR and the Corps on a day-to-day basis."

More than 130 staff from a broad range of DWR programs and disciplines participated, as well as other agencies, including the Central Valley Flood Protection Board, Delta Stewardship Council, California Natural Resources Agency and California Department of Fish and Wildlife. Topics included regulatory authorities under the Rivers and Harbors and Clean Water Acts; jurisdictional determinations; mitigation standards and checklists; consultations for endangered species, essential fish habitat, historic and cultural resources and tribal coordination. Given the high level of interest and value of the workshops, DWR plans to work with the Corps to offer additional educational workshops in the future.

DWR Deputy Director Gary Bardini and U.S. Army Corps of Engineers Sacramento District Commander Colonel Mike Farrell sign a historic Memorandum of Understanding in August 2015 committing to partnering on integrated water management solutions in Northern California. The agreement is being heralded as a model for other parts of the State.

People

Internal Audits Office Adds Value

Whether you work at DWR as an engineer, scientist, auditor or any other position, your role is a vital part of its mission. DWR's four auditors in the Internal Audits Office (IAO) are doing their part to ensure that DWR achieves its objectives.

"We have a sometimes difficult, but unique job," said Jeffrey Ingles, DWR Chief Auditor since 2009. "Although the audit team may not always be welcomed, our function is to add value and provide a different perspective or insight into a business process."

The IAO's mission is to provide independent, objective analysis and consulting services to add value to and improve DWR operations, as well as to assist the Directorate in finding and correcting deficiencies in financial and operational areas. This charge is accomplished by Ingles, Senior Management Auditor David Whitsell, Associate Management Auditor Chris Kang, Associate Management Auditor Thomas Whalen and Office Technician Inez DeOrsene.

The IAO typically completes 10 to 12 audits or review consultations per fiscal year. Audits may take 100 to 300 hours. Consultations have dealt with subjects including fuel management, bond expenditures, enterprise process guide development, nepotism surveys and service contract development. Audits and reviews can range from the use of CAL cards and cellular devices to warehouse management and information technology practices.

"Our consultation on the fuel management project provided the program with information to determine if the system would be effective and efficient and prevent DWR from spending funds unnecessarily," said Ingles "The result was a fuel card system that provided an integrated system that achieved the intended objectives."

The most successful audit projects occur when the auditor and auditee unite as consultant and client.

"We start by gaining an understanding of the topic before an engagement," said Ingles. "Our role is to get the facts, ask the questions, test the policy and procedures and prepare a report for management."

Ingles has experience as an auditor with a commercial financial institution and management experience with State agencies including Caltrans and Toxic Substances Control. He has Master of Science and Bachelor of Science degrees in Business Administration.

"Being DWR's Chief Auditor can sometimes feel like being a confessional when employees stop me to express their concerns," said Ingles. "Our role is to listen and if warranted, advise management of the potential risks to DWR."

"Auditors frequently provide a global perspective to the project teams while simultaneously learning the new process and helping to build in quality control proactively in the development stages rather than requesting revisions upon implementation," said Ingles.

To complete IAO's mission, the team provides support to programs by acting as a liaison with external auditors, such as the California State Auditor, Department of Finance, Department of General Services and State Controller's Office.

The IAO completes work based on risk, statutory requirements and at the request of management. IAO staff are always open to discuss your project to determine if they can help you identify areas where risk can be mitigated and value added.

Jeffrey Ingles, DWR's Chief Auditor and his team of four auditors complete about 12 audits per year.

New Hires

Monica Alvarez
Engineering
Staff Services Analyst

Bradly Arnold
IRWM -North Central Region Office
Engineer

Kevin Auyeung
Engineering
Office Assistant (Typing)

Jose Avila
Operations and Maintenance
Heavy Equipment Mechanic

Kathryn Baines
CVFPB
Staff Services Analyst

Amber Bravo
IRWM-South Central Region Office
Staff Services Analyst

Cameron Brown
IRWM-North Central Region Office
Associate Governmental Program Analyst

Leslie Carter-Padilla
Human Resources Office
Staff Services Manager I

Randy Castro
Technology Services
Systems Software Specialist II

Nitin Chandra
Operations and Maintenance
Associate Governmental Program Analyst

Marina Chernykh
Fiscal Services
Accounting Officer

Mark Church
Operations and Maintenance
Heavy Equipment Mechanic

Tavis Dahlke
O&M-San Joaquin Field Division
HEP* Mechanic I

Kayla Demasi
Engineering
Office Assistant (Typing)

Justin Eaves
O&M-Delta Field Division
HEP* Mechanic I

Nicholas Ellis
Flood Management
Electrical Engineer

Katherine Elsberry
Fiscal Services
Accountant Trainee

Virginia Fargher
Flood Management
Office Technician (Typing)

*Hydroelectric Plant
CVFPB: Central Valley Flood Protection Board
IRWM: Integrated Regional Water Management
O&M: Operations and Maintenance

New Hires

Leah Feigelson
Engineering
Engineering Geologist

Kurt Fredrick
O&M-San Joaquin Field Division
Utility Craftsworker

Randy Fuentes
Operations and Maintenance
Heavy Equipment Mechanic

Calysta Gable
Engineering
Office Assistant (Typing)

David Garcia
O&M-San Joaquin Field Division
HEP* Mechanic I

Blanca Gomez Noriega
CVFPB
Associate Governmental Program Analyst

Ebony Goodloe
O&M-Southern Field Division
Business Service Assistant

Dustin Goularte
O&M-Delta Field Division
Junior Engineering Technician

Trinidad Gutierrez
Operations and Maintenance
Heavy Equipment Mechanic

Catherine Hansen
State Water Project Analysis Office
Office Technician (Typing)

Aaron Harris
CVFPB
Staff Services Analyst

Priscilla Herrera
Operations and Maintenance
Engineer

Jason Howell
O&M-San Joaquin Field Division
Junior Engineering Technician

Jay Huang
Environmental Services
Senior Programmer Analyst

Stanley Jayko
Operations and Maintenance
Heavy Equipment Mechanic

Christy Jones
Executive
Engineer

Ronnie Jones
O&M-San Joaquin Field Division
Materials and Stores Specialist

Evan Kopshy
Environmental Services
Associate Safety Engineer

Bess Leung
Fiscal Services
Associate Accounting Analyst

Angela Lew
Technology Services
Systems Software Specialist II

Maria McCann
Engineering
Environmental Scientist

Eric Miao
CVFPB
Engineer

*Hydroelectric Plant
CVFPB: Central Valley Flood Protection Board
O&M: Operations and Maintenance

First Responders

DWR Amateur Radio Team Marks First Year Anniversary

BY LAUREN BISNETT

There's a flood in your neighborhood, and raging waters have wiped out roads, carrying with them vital communications utilities like fiber optic cables and landlines. You have your cell phone, so you're not worried about being cut-off from first responders, right?

Wrong. With all the emergency response calls, the cell networks are jammed or the towers are down and satellite technology has failed too. You or someone you love needs help, so how do you signal for it? That's when the DWR Amateur Radio Team (DART) comes to the rescue.

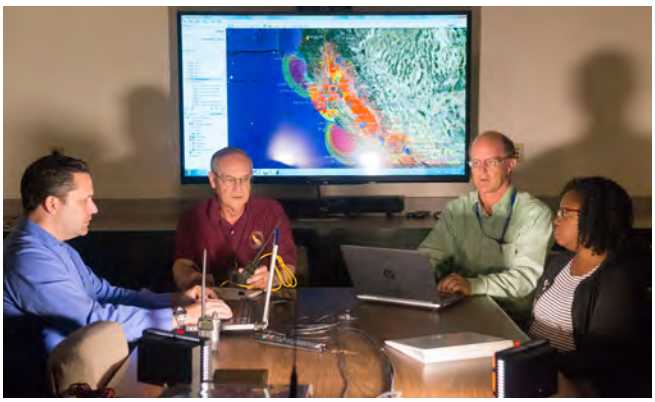
DART is a voluntary team of 12 radio enthusiasts and emergency responders who extend DWR's statewide emergency response program through the use of amateur radio – also known as HAM radio. DART has a mission-critical function in DWR's emergency response strategy because it provides dependable communication when all else fails.

"It's used in emergency situations because it doesn't depend on the same infrastructure as the telephone system," said Earl Nelson, DART Lead. "It is battery operated and not dependent on the power system or other modern systems."

DART formed last fall to assist and expand emergency response communications during any given DWR emergency: flood, fire, earthquake or other natural disaster. Amateur radio provides back-up capabilities when other communications methods, such as cell phones, satellite phones and landlines, are non-operable.

"It gets away from the Global Positioning System, the cellular system," said Dan Huitt, DART member who has worked with DWR for three years. "It's

(Above) DWR employees outside the Emergency Communications Command Trailer during a DWR communications drill this summer. (Right) Todd Thompson of the Division of Statewide Integrated Water Management checks the ham mobile console inside the Emergency Communications Command Trailer.



(Left to Right) DWR Amateur Radio Team members Daniel Huitt, a Mechanical Engineer, Earl Nelson, an Environmental Program Manager and Todd Thompson, a Senior Engineer, program new HAM radios with Sarah Okumu, an Engineer with the Flood Operations Branch. (Below) Mark Chadwick, DART member, prepares radio equipment for emergency drill.

truly an alternative method of communication. Its roots are radio. When everything breaks down or you're out in the middle of nowhere, this is what you need."

Through HAM radio, the DART is able to communicate with other agencies and organizations, such as cities, counties, police, firefighters, ambulance personnel, hospitals and more. DWR has used HAM radio during emergencies such as the Feather River and San Joaquin River levee breaks in 1997 and during 9/11 when former DWR employee Jim Rich used it to arrange an airlift of blood from California to New York.

"From an emergency perspective, you can communicate with people outside the local area you're in for help, and that's really the intent of HAM," said Huitt. "It goes beyond CB radio, which is local within a couple miles, but if you've got a HAM radio repeater, you could be hundreds of miles from the location you're trying to reach."

Created in the 19th century, HAM radio is a wireless technology that is capable of sending signals to the moon and back, using Morse code, voice and digital data, such as email.

"HAM radio is beyond just a radio," said Huitt. "It's an alternate form of communication in the 21st century. It's just underutilized because most people don't know about it. You could go without Internet service by accessing the Internet through the HAM system for sending digital data, like email."

DART is deploying and programming transceivers (HAM frequency transmitters and receivers) at the Flood Operations Center, the Incident Command Post and field office locations, making radio communication statewide possible. Each DWR Field Office is already equipped with a transceiver, and the repeater networks have been in place for many years.

One of the HAM networks DART utilizes is the California Amateur Radio Linking Association, which uses multiple repeaters that are linked together to create a wide coverage across Northern and Central California and Western Nevada.

In June, as a part of their mission, DART hosted its first drill to test the system and develop response processes in an emergency.

"DART plans to identify and provide training opportunities for DWR HAM radio operators, including help for people who would like to get a HAM license to acquire certification and licensure," said Sarah Okumu, Standardized Emergency Management System Communication Unit Leader. "DWR is developing emergency procedures for operator deployment, as well as more exercises to ensure reliability and functionality of the system."

DART members include Earl Nelson, Daniel Huitt, James Williams, Michael Urbano, Todd Thompson, John Kirk, Nathan Millingar, Shawn Mayr, Rob Reis, Mark Chadwick, Robert Clarke and Kyle Bickler.

If you are interested in becoming a DART member, contact Sarah Okumu at (916) 574-0629.

New Hires

Huy Nguyen
Environmental Services
Senior Programmer Analyst

The Nguyen
Business Services
Staff Services Analyst

Matthew Owens
IRWM-South Central Region Office
Engineering Geologist

Juana Palma Hernandez
Fiscal Services
Accountant Trainee

James Pearce
Technology Services
Associate Information Systems Analyst

Luong Phong
Operations and Maintenance
Systems Software Specialist III

Kevin Pulskamp
O&M-Oroville Field Division
HEP* Electrician I

Baljit Randhawa
Executive
Legal Secretary

Dominique Rodriguez
Flood Management
Office Technician (Typing)

Esther Romo
O&M-San Joaquin Field Division
Management Services Technician

Hollund Rudolph
IRWM-South Central Region Office
Environmental Scientist

Brian Searles
O&M-San Joaquin Field Division
HEP* Electrician I

Savleen Sekhon
Technology Services
Senior Programmer Analyst

Dane Sheridan
O&M-San Joaquin Field Division
Utility Craftsworker

Vinay Singh
Operations and Maintenance
Associate Governmental Program Analyst

Allison Smith
Business Services
Office Technician (Typing)

Chun Tai
Fiscal Services
Accounting Officer

Emily Thor
Executive
Attorney

Robert Tibstra
IRWM-South Central Region Office
Senior Environmental Scientist

Melanie Van Brocklin
O&M-San Luis Field Division
Office Technician (Typing)

Fawna Velci
O&M-Southern Field Division
Staff Services Analyst

James Vickers
O&M-San Luis Field Division
HEP* Electrician I

*Hydroelectric Plant
IRWM: Integrated Regional Water Management
O&M: Operations and Maintenance

A Heroic Act

Casey Lund Rescues Man Trapped in Vehicle Submerged in Willow Slough

While many would think saving a life happens once in a lifetime, it is not the case for Sacramento Maintenance Yard's Utility Craftsworker Supervisor Casey Lund.

On May 2, 2016, Lund rescued a man trapped in a submerged vehicle near Willow Slough on the north side of Davis while he was conducting State Erosion Repair site inspections. The rescue was his second life-saving moment in 16 years of State service.

"This year, after we had higher levels of water, I wanted to check the Willow Slough area between Davis and Woodland to see if a particular erosion site was larger," said Lund. "While driving along the dirt road, I could not see the channel from the truck. The grass was six feet high."

When looking through the tall grass for the erosion site, Lund found an inverted vehicle partially above water.

"I immediately noticed a tire sticking out of the weeds and thought the vehicle was abandoned," said Lund. "I hopped out of my vehicle to take a photo. When walking along the opposite side of the vehicle, I saw a leg hanging out of the window."

Lund called 911 and went to the vehicle. The victim's leg was caught in the door, which was blocked by water and grass reeds.

"The gentleman was stuck under the steering wheel. The car was halfway full of water and had been there for two hours.

"I pried the door open and held him up, hoping help would arrive quickly. He kept saying he wanted out of the car," said Lund. "With his verbal permission, I was able to drag him out of the water and sit him on the bank."

In 2005, as a California Department of Transportation (Caltrans) Equipment Operator Lund was nominated for the Governor's Medal of Valor for helping a coworker repel off of a rock face when he encountered heat stress.

"As a team, we did a lot of dangerous rock removal up and down California," Lund said.

In 2002, while working at Caltrans District I in Eureka as a Heavy Equipment Operator, Lund received the Governor's Medal of Valor by Governor Gray Davis for rock scaling. With a goal of preventing rockslides, Lund was part of a Caltrans team responsible for removing rock and debris that had a high risk of falling on the State highway system.

"At the end of the day, I only did what others would have done," Lund said.

Be Water Safe

DWR's Aquatic Adventure Camp Teaches Water Safety Skills

BY AKIELA MOSES

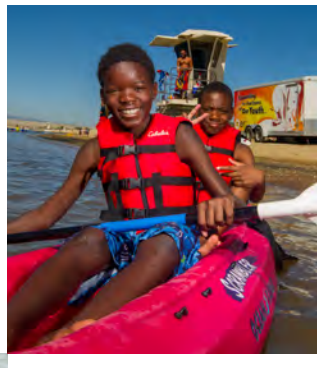
As families visit the State Water Project (SWP) reservoirs, DWR, in partnership with the Department of Parks and Recreation and California Police Activity Leagues, provided basic water safety training and water sport activities to more than 800 children at the 2016 Aquatic Adventure Camps.

The Aquatic Adventure Camp (AAC) program was established in 2001, as a result of a request by DWR's SWP Recreation Coordinating Committee, and with leadership from the Public Affairs Office's Chief of Water Education and Outreach Branch Dorothy Benjamin. The program's focus is on teaching children basic water safety skills and procedures in both a fun and educational way.

The free program invites children to participate in a variety of activities including water-sports like kayaking and paddle boarding, as well as first aid and life jacket training sessions and general education about physical health.

"I am passionate about DWR's water safety program because we not only demonstrate and teach the public about water safety, but involve the community so they have a better understanding of its importance," said Reyna Reyes, Lead Coordinator for water safety with the Water Education and Outreach Branch.

With these camps, DWR hopes to make strides in reducing the number of accidental drownings that occur along the SWP. Drownings are the second leading cause of injury-related death among children under 14 years of age, and the fifth leading cause for people of all ages, according to the Centers for Disease Control and Prevention.



A total of 20 camps were held this summer for children aged 17 and under at Lake Perris in Riverside County, Lake Del Valle in Alameda County, the SWP Huron Fishing Access in Fresno County, as well as the O'Neil Forebay and San Luis Reservoir both in Merced County.

The award-winning AAC Program is just one example of the steps DWR has taken to both support and protect the community it serves.

The program also includes the "Vamos a Aprender" water safety education camps put on by the East Bay Regional Parks District that teaches children both in English and Spanish.

For water safety information, visit http://www.water.ca.gov/recreation/safety/

(Above) Aquatic Adventure Camp at Lake Perris. (Below) Nick Schriver, East Bay Regional Park District Aquatic Supervisor, and Reyna Reyes, DWR Event Coordinator, oversee the launch of the "Vamos a Aprender" program at Lake del Valle.

New Hires

Alicia Villegas
Fiscal Services
Office Technician (Typing)

Hannah Walter
Flood Management
Staff Services Manager II (Supv.)

Justin Zumbro
Engineering
Engineering Geologist

Promotions

Christine Alexander
Engineering
Environmental Program Manager I (Supv.)

Vince Alvidrez
O&M-San Joaquin Field Division
HEP* Maintenance Supt.

John Amabile
O&M-San Luis Field Division
HEP* Electrician II

Justin Ander
Technology Services
Associate Information Systems Analyst

Erika Arias
O&M-San Joaquin Field Division
Senior HEP* Operator

Wyatt Arnold
IRWM -North Central Region Office
Engineer

Rachel Ballanti
Executive
Program Manager I

Juan Berumen
O&M-San Joaquin Field Division
Utility Craftsworker

Charlotte Biggs
Executive
Program Manager I

Lloyd Boyer
O&M-Oroville Field Division
HEP* Mechanic I

Jason Brabec
Integrated Regional Water Management
Senior Engineer

Michael Brummer
O&M-San Joaquin Field Division
HEP* Maintenance Supt.

Andrea Buckley
CVFPB
Environmental Program Manager I (Supv.)

Mary Calleja
Technology Services
Data Processing Manager IV

Christopher Camarillo
Technology Services
Staff Information Systems Analyst

Zua Cha
Business Services
Office Technician (Typing)

Mei Lei Chen
Technology Services
Systems Software Specialist III

Ling-Ru Chu
Environmental Services
Senior Environmental Scientist

*Hydroelectric Plant
CVFPB: Central Valley Flood Protection Board
O&M: Operations and Maintenance

Promotions

Irma Clevenger
O&M-San Luis Field Division
Assistant Utility Craftsworker Supt.

Marla Cole
Executive
Executive Assistant

Christa Collin
IRWM-South Central Region Office
Senior Environmental Scientist

David Conley
Operations and Maintenance
Systems Software Specialist I

Holly Cox
Business Services
Business Service Assistant

David Crothers
Engineering
Senior Cost Estimator

Vojislav Cvijanovic
Safety of Dams
Senior Engineer

Ruth Darling
CVFPB
Senior Environmental Scientist

Michael Davis
O&M-Southern Field Division
Senior HEP* Operator

Rebecca Dominguez
Executive
Staff Services Manager I

Jonathan Duncan
Statewide Integrated Water Management
Senior Engineer

Kenneth Dunn
O&M-Oroville Field Division
HEP* Electrical Supervisor

John Egan
Operations and Maintenance
Mobile Equipment Superintendent I

Travis Faria
O&M-Delta Field Division
Senior HEP* Operator

Randy Fessler
Executive
Senior Engineer

Yao-Hsiang Fock
Statewide Integrated Water Management
Senior Engineer

Abbigail Foutch
Human Resources Office
Training Officer I

Rose Garcia
Executive
Office Technician (Typing)

Timothy Godwin
Integrated Regional Water Management
Senior Engineering Geologist

Lorenzo Granillo
Business Services
Materials and Stores Specialist

Richard Harmonson
Technology Services
Data Processing Manager III

Garrett Hart
Engineering
Construction Supervisor II

*Hydroelectric Plant
O&M: Operations and Maintenance

DWR Promotes Water Conservation at State Fair

BY AKIELA MOSES

As California's drought continues, DWR highlighted the importance of water conservation with three educational exhibits at the 2016 California State Fair at Cal Expo.

The Department's theme "Conservation: the California Lifestyle" was carried throughout each of the three exhibits to illustrate water-wise landscapes and simple steps residents can take to conserve.

The two outdoor exhibits "Water-Wise" and "Water-Wise and Edible Garden" in the fair's Farm Section displayed a variety of native or drought-tolerant plants, as well as fruits, vegetables and herbs that require minimal water use. Assisted by the California Conservation Corps, the exhibit showed the step-by-step process to remove turf and install water-wise gardens.

At the indoor exhibit, "Conservation: the California Lifestyle," located in the Counties Building, DWR staff and representatives provided brochures and other educational materials on methods to reduce water use both within and outside of the home.

"The message is to create water-wise

(Above) DWR's water efficient gardens at the California State Fair display step-by-step examples of how to replace turf with drought-tolerant plants. Brittany Mullin (right), DWR Contract Analyst, promotes water conservation by giving State Fair visitors five-minute shower timers.

sustainable landscapes while providing localized wildlife ecosystems that contribute to a broader sustainable watershed and provide for drought resiliency while promoting a better lifestyle," said Kent Frame, Program Manager II with the Division of Statewide Integrated Water Management.

Visitors viewing these exhibits learned that taking on a water-wise lifestyle change helps their community in more ways than one. It provides numerous individual benefits, including vibrant landscapes.

Thanks to the assistance of more than 100 volunteers who staffed the three exhibits during the 17-day event, more than 670,000 visitors were informed about the importance of conservation and the simple ways they can do their part.

"This year we had 308 shifts and 152 volunteers from many different Divisions and Offices within the Department and non-DWR employees," said Dorothy Benjamin, Chief for DWR's Water Education and Outreach Branch. "We are deeply thankful for their generosity because we couldn't have done it without them."

Volunteers were from DWR, the Department of Food and Agriculture, the Department of Fish and Wildlife, the California Conservation Corps and other State agencies.

(Above) A variety of native and drought-tolerant plants showcase in the exhibit. (Below) DWR's "Conservation: the California Lifestyle" exhibit featured at the California State Fair in July 2016 illustrates water-wise landscaping ideas and simple steps to conserve water at home.

California Department of Water Resources

Promotions

Vic Hernandez
O&M-Southern Field Division
Utility Craftsworker

Jeffrey House
O&M-Oroville Field Division
HEP* Maintenance Superintendent

Doumon Kashkooli
Engineering
Water Resources Technician I

Timothy Kennelly
Operations and Maintenance
Principal HEP** Utility Engineer

Suzanne Khayat
Flood Management
Staff Services Manager I

John Kirk
IRWM-South Central Region Office
Senior Engineering Geologist

Dawn Klinger
Human Resources Office
Senior Personnel Specialist

James Kortuem
Flood Management
Utility Craftsworker

Michael Kurtenbach
Operations and Maintenance
Staff Services Analyst

Ian Labon
O&M-Southern Field Division
HEP* Technician II

Linh Tue Lac
Fiscal Services
Senior Accounting Officer

Cameron Lancaster
Engineering
Engineer

Julie Lee
Engineering
Associate Cost Estimator

Anthony Locke
Fiscal Services
Associate Budget Analyst

Eric Lundquist
Operations and Maintenance
Associate Control Engineer

Robert Madrid
O&M-San Joaquin Field Division
HEP* Mechanical Supv.

Romain Maendly
Statewide Integrated Water Management
Senior Engineer

Danielle Manaois
Operations and Maintenance
Staff Services Analyst

James Matsuda
O&M-Delta Field Division
Business Service Officer I

Leah McNearney
Operations and Maintenance
Program Manager I

Aaron Miller
Operations and Maintenance
Supervising Engineer

*Hydroelectric Plant
**Hydroelectric Power
IRWM: Integrated Regional Water Management
O&M: Operations and Maintenance

Choyce Leads San Joaquin Field Division

Darren Choyce takes pride in his new role as Chief of the San Joaquin Field Division (SJFD) where he has dedicated 25 years to key positions covering the operation, maintenance and management of the 200-employee State Water Project unit there.

"I plan to support and help the existing San Joaquin Field Division safety culture grow and continue to work towards instilling our core values of commitment, integrity, accountability and respect in all personnel," said Choyce, who became the seventh SJFD Chief in July.

Prior to his appointment, Choyce held SJFD positions as a Mechanical and Technical Occupational Trainee, Operation's Service Assistant, Hydroelectric Plant (HEP) Operator Apprentice, Senior HEP Operator, Operations Electrical Instructor for the Operations and Maintenance (O&M) Training Center and Operations Superintendent.

"Serving as Operations Electrical Instructor for the O&M Training Center was a gratifying experience teaching apprentices not only about the operations and electrical aspects of the plants they work in but how to be safe while pursuing their careers," he said.

Choyce has worked start-ups of SJFD's Coastal Aqueduct extension plants, tested control systems, helped install new pumps at Edmonston Pumping Plant and implemented a rewrite of DWR's Dive Policy.

According to Choyce, a memorable project was the repair near Taft in Pool 30 of the California Aqueduct, which was dewatered, repaired and made like new in a little over two months.

SJFD, home of Edmonston Pumping Plant with the highest lift in the world, covers approximately 5,000 square miles north to south from Kettleman City to Fort Tejon and east to west from San Luis Obispo to Tehachapi. Providing a water supply for nearly 20 million Californians, SJFD's facilities include nine pumping plants with 74 rotating units that comprise 40 percent of the SWP system, 123 miles of California Aqueduct, 14.8 miles of Coastal Branch Aqueduct and 100.75 miles of coast pipeline.

Southern Field Division Gains New Chief

From student to Chief of the largest DWR field division in staffing and area, Gabino Velazquez worked 38 years at DWR's Operations and Maintenance five field divisions before being appointed Southern Field Division Chief in June 2016.

As the leader of more than 200 employees, Velazquez manages the operations and maintenance of all electrical, mechanical and civil work for the southern portion of the State Water Project (SWP).

While operating and maintaining 193 miles of the SWP, Southern Field Division delivers SWP water to three of California's largest counties – Los Angeles, Riverside and San Bernardino. From Carley V. Porter Tunnel to Castaic Lake on the West Branch and Lake Perris on the East Branch, Southern Field Division facilities include six pumping plants, four hydroelectric power plants, four major dams, seven reservoirs, 108 miles of Aqueduct, 25 check sites, 66 miles of pipeline and 19 miles of tunnel.

Velazquez, who was Chief of San Joaquin Field Division from 2015 to 2016, has worked as a Mechanic at all field divisions. While he has enjoyed several of his assignments, a highlight of his career was the completion of San Joaquin Field Division's Pool 30 emergency repair.

"The repair was extraordinary due to the scale, magnitude of the repairs and working three months with several divisions in DWR and contractors to complete the repairs in only one minor accident," said Velazquez.

Southern Field Division's list of projects includes condition assessment on main units, South State Water Project hydropower relicensing Federal Energy Regulatory Commission project No. 2426 and Angeles Tunnel inspection.

"My goal is to ensure the safety and development of my staff so they can operate efficiently in their day to day duties and continue to accomplish the Department's mission," said Velazquez.

California Department of Water Resources

Promotions

Rebecca Mills
Executive
Executive Assistant

Robert Mills
O&M-San Joaquin Field Division
HEP* Mechanic I

Matthew Mobley
O&M-Oroville Field Division
Senior HEP* Operator

Monica Moules Reis
CVFPB
Senior Engineer

Rhiannon Mulligan
Environmental Services
Environmental Scientist

Brittany Mullin
Business Services
Associate Governmental Program Analyst

Dustin Natov
Engineering
Staff Services Analyst

Timothy Nelson
Engineering
Engineer

Steven Nichols
O&M-Southern Field Division
HEP* Maintenance Supt.

Nicholas Novoa
Engineering
Engineering Geologist

Verena Ortiz
Human Resources Office
Personnel Specialist

Jeremy Orvis
O&M-Southern Field Division
HEP* Technician II

Clint Parker
Flood Management
Associate Governmental Program Analyst

Lisa Peters
Bay-Delta Office
Associate Governmental Program Analyst

Michael Ramsey
SWP Power & Risk Office
Supervising HEP** Utility Engineer

Jasmine Ray
Engineering
Staff Services Analyst

Timothy Resh
Engineering
Associate Cost Estimator

Andrea Riley
Human Resources Office
Staff Services Manager I

Alfredo Rodriguez
O&M-Southern Field Division
HEP*Electrician II

Joseph Rodriguez
O&M-Delta Field Division
Senior HEP* Operator

Martha Romaso
Fiscal Services
Senior Accounting Officer

*Hydroelectric Plant
**Hydroelectric Power
CVFPB: Central Valley Flood Protection Board
O&M: Operations and Maintenance

Promotions

Timothy Salcido
O&M-San Luis Field Division
Senior HEP* Operator

Sean Savigar
O&M-Southern Field Division
HEP* Mechanic I

Jane Schafer-Kramer
Statewide Integrated Water Management
Research Program Specialist I (GIS)

Brian Schoene
O&M-San Joaquin Field Division
Electrical Engineer

Frances Schulte
IRWM - South Central Region Office
Associate Governmental Program Analyst

Luis Sepulveda
O&M-Oroville Field Division
Water Resources Engineering Associate

Heather Shannon
Integrated Regional Water Management
Senior Engineering Geologist

Preston Shopbell
CVFPB
Senior Engineer

Sasha Silvestrini
Operations and Maintenance
Staff Services Analyst

Kenneth Smith
O&M-Oroville Field Division
HEP* Electrician II

Kevin Smith
O&M-Southern Field Division
Senior HEP* Operator

Carlos Soria
O&M-Southern Field Division
Water Resources Engineering Associate (Supv.)

Christopher Souza
O&M-Delta Field Division
Assistant Utility Craftsworker Supt.

Tompat Stephens
Technology Services
Systems Software Specialist III

Vadim Stetsenko
Engineering
Construction Supervisor I

Loyd Thomas
O&M-Delta Field Division
Associate Governmental Program Analyst

Nakithia Thomas
Fiscal Services
Senior Accounting Officer

Wendy Underhill
O&M-Oroville Field Division
HEP* Maintenance Supt.

Kristina Vilhauer-Reese
Environmental Services
Senior Environmental Scientist (Supv.)

Ruey-Wen Wang
Integrated Regional Water Management
Engineer

Glenn Ward
O&M-San Joaquin Field Division
HEP* Mechanical Supervisor

Wesley Watson
Operations and Maintenance
Chief Water and Power Dispatcher

*Hydroelectric Plant
CVFPB: Central Valley Flood Protection Board
IRWM: Integrated Regional Water Management
O&M: Operations and Maintenance

Chief of Southern Region Office Appointed

Taking the helm of Southern Region Office (SRO), Michael Sabbaghian looks forward to the new challenges that will bring opportunities to make DWR a better workplace.

He brings 22 years of State experience in leading efforts for flood protection in the Central Valley and emergency recovery in an aftermath of earthquakes, floods and fires throughout California.

Sabbaghian, who was appointed SRO Chief in September, will be DWR's primary link with State, federal and local water resources management agencies in Southern California.

Headquartered in Glendale, SRO's 40 employees cover 60,253 square miles that is about 40 percent of California's population. Projects handled by the office cover environmental compliance, hydrogeologic investigations, land surveys, watermaster services, Salton Sea restoration, groundwater and water conservation.

"I will ensure the office is known for providing a world class service in delivering products to all programs that trust us with their projects and programs," said Sabbaghian. "I see the office as being an extension to the work being done at headquarters. In my past assignments, I was responsible for managing grants. This position will allow me to see the delivery of these projects funded by grants."

During his eight years with DWR, Sabbaghian was the Division of Flood Management's Flood Risk Reduction Projects Branch Chief where he was responsible for more than a billion dollars of State and federal flood protection projects. He also formed and managed the branch that developed and administers competitive grants to improve flood protection throughout the Central Valley. Projects included Folsom Dam Auxiliary Spillway and Natomas Basin Levee Improvements.

Before joining DWR, Sabbaghian spent more than 14 years for the Governor's Office of Emergency Services, where he worked as Executive Duty Officer and managing the Safety Assessment Program and recovery programs providing grants to local governments, businesses and individuals. While at the Pasadena Office, he oversaw the recovery process in Los Angeles County after the Northridge Earthquake. He also oversaw the civil and geotechnical engineering, environmental and historic and flood and debris management resources in support of emergency disaster response throughout California.

"I secured appropriate federal disaster grants to build a new hospital in Los Angeles after it suffered massive damage," said Sabbaghian. "It was rewarding to reinvigorate the Safety Assessment Program at Cal OES that was set aside in a few boxes to almost 4,000 ready resources to respond to disasters, including sending resources outside of California to Katrina hit areas. Because I am very systematic, once everything is set up then it runs itself."

A member of the American Society of Civil Engineers, Sabbaghian has a Civil Engineering degree from the University of the Pacific and a Masters in Business Administration from Phoenix University. Since his childhood in Marin County, Sabbaghian knew he wanted to become an engineer after visiting highway, dam and bridge jobsites with his father who is an engineer.

Sabbaghian's dedication to seeing his team succeed goes beyond the workplace. A speedster forward who enjoys doing most of the scoring for his soccer teams, he cherishes the opportunity to help the teams succeed.

Retirement

Perla Netto-Brown

After taking her first accounting class in high school, Perla Netto-Brown knew exactly what she wanted to do in her future career.

"I went straight into college as a declared major in Business Administration with a concentration in Accounting, and I never doubted or wavered from my decision," said Netto-Brown, who retired in July as the Chief of the Fiscal Services Division after 33 years of State service.

After earning her bachelor's degree from California State University, Los Angeles, Netto-Brown joined the California State Auditor's Office as an Assistant Financial Auditor. She audited State Agencies for financial and performance compliance and prepared audit reports before starting her DWR career in December 1986 as an Associate Accounting Analyst.

While working her way up to Division Chief of Fiscal Services, Netto-Brown overcame many obstacles and saw various changes take place within her division and DWR.

As Division Chief of more than 100 employees in three branches since May 2000, Netto-Brown led Fiscal Services in implementing SAP, managing through the California Energy Crisis and State Budget Crises and modernizing procedures, such as Wire Transfer capability and Travel Expense Claim Reimbursement through CalATERS.

She became one of DWR's lead negotiators on the State Water Project Contract Extension Team that aimed to maintain the financial integrity of the project by continuing to provide long-term and affordable financing.

"The administration of the State Water Project is unique and interesting," said Netto-Brown. "No other department manages a statewide public utility that serves over 25 million Californians."

Among her many accomplishments, it was setting a good example, educating and supporting others coming up through the ranks that Netto-Brown appreciated most.

"Initially I enjoyed seeing all of the numbers come together," she said. "Every good accountant loves to see the bottom line balance. Over time that has changed when asked what she enjoyed most about her career. I enjoyed mentoring people and sharing my historical knowledge with others. I want to see continuous improvement in Fiscal so they can achieve continued success as a division."

Unsurprisingly, due to her kind-hearted and down-to-earth nature, Netto-Brown was frequently involved in multiple DWR fundraisers to help others. She explained that nothing feels better than doing your part to help make someone's day a little brighter.

She is ready to "move" into retirement by taking Ballroom dancing classes with Bill, her husband of 30 years. She and her husband both love to travel and have planned tours of Austria, Germany and the Czech Republic. She also plans to spend more quality time with her family and give back to the community through her involvement in various non-profits, including "Meals on Wheels."

"They were there for my mom when she needed them, so I want to return the favor," said Netto-Brown.

Promotions

Robert Wickstrom
O&M-Delta Field Division
HEP* Mechanic I

Ike Williamson
O&M-San Luis Field Division
Water Resources Engineering Associate (Supv.)

Jimmie Wright
O&M-Delta Field Division
HEP* Maintenance Supt.

Marcus Yee
Executive
Program Manager III

Retirements

James Baldock
Operations and Maintenance
Associate Control Engineer

Stephen Bradley
Flood Management
Principal Engineer

John Bunce
O&M-Southern Field Division
Chief Field Division

Richard Burnett
Flood Management
Water Resources Engineering Associate

David Canchola
O&M-Delta Field Division
HEP* Maintenance Superintendent

Barry Conlin
O&M-San Luis Field Division
HEP* Mechanic II

Randy Dedeker
Flood Management
Utility Craftsworker

Robert Fill
Engineering
Chief Construction Supv.

George Gongora
O&M-San Luis Field Division
HEP* Electrician II

Veronica Hicks
SWP Power & Risk Office
C.E.A.

Xiaohong Huang
O&M-San Joaquin Field Division
Senior Environmental Scientist

Walter Huber
Operations and Maintenance
Electrical Construction Supervisor I

John Johannis
Flood Management
Senior Engineer

Nancy Kleider
O&M-San Joaquin Field Division
HEP* Technician II

Christina Kuo
Flood Management
Senior Engineer

*Hydroelectric Plant
O&M: Operations and Maintenance

Retirements

Paula Landis
California Water Commission
Executive Officer

Maria Lau
Operations and Maintenance
Systems Software Specialist II

Celeste Lavrigata
Executive
Executive Assistant

Jeffery McCallister
Business Services
Business Service Assistant

Ramon Murillo
Operations and Maintenance
Supervising Telecommunications Engineer

Reza Namin
Technology Services
Systems Software Specialist III

Frances Niederberger
Flood Management
Office Assistant (Typing)

Robert Parmley
O&M-San Joaquin Field Division
HEP* Mechanic II

Edward Perez
IRWM- South Central Region Office
Engineer

Shawn Pike
IRWM-Northern Region Office
Senior Engineer

Maynard Reynolds
Operations and Maintenance
Heavy Equipment Mechanic

Ruben Sanchez
O&M-San Joaquin Field Division
HEP* Technician III

Kenneth Shier
Flood Management
Building Maintenance Worker

Brian Smith
Flood Management
Supervising Engineer

Kimberly Van Vliet
Operations and Maintenance
Staff Information Systems Analyst

Teresa Wegener
Flood Management
Supervising Engineer

Kevin Wright
O&M- Oroville Field Division
Water Services Supervisor

Robert Yeadon
Bay-Delta Office
Supervising Engineer

*Hydroelectric Plant
IRWM: Integrated Regional Water Management
O&M: Operations and Maintenance

Paul Marshall

In his first job at age 12, Paul Marshall earned a couple of cents to a nickel to fold lessons and stuff them in envelopes for a home schooling company.

Although Marshall's family tree of engineers inspired him to follow that career path, he appreciates his earlier experiences.

"Growing up in the San Francisco Bay area and taking marine biology helped to push me towards water engineering and environmental engineering," said Marshall, who retired as Chief of DWR's Bay-Delta Office in September. "Working in the grocery store helped me to understand the agricultural processes when I became a regulator in the Central Valley."

A Sacramento State graduate with Bachelor's and Master's degrees in Civil Engineering, Marshall's State career included more than 18 years at DWR and 10 years with the Central Valley Regional Water Quality Control Board. Before joining the Bay-Delta Office (BDO) in 2002, Marshall worked for the CalFed Bay Delta Program's environmental water quality program and DWR's Central District (now South Central Region Office) on levees and habitat. He has also worked on the Bay Delta Conservation Plan and in the Division of Flood Management.

"Aside from the drought we are in, the most challenging part of being the chief of BDO is personnel," said Marshall. "Often, personnel are great at doing the job at hand. But getting them to think about the goals of the Department as a whole and grow into the next position they may take is very challenging. So I started some succession planning times where the senior staff of the office could share insights we have learned over the years with younger staff."

As part of DWR's Flood Management team for three years, Marshall worked on a variety of projects, including the Central Valley Flood Protection Plan (CVFPP) 2012 and the Regional Flood Management Plan (RFMP).

"I enjoyed the way the CVFPP and RFMP were integrated and rolled out as a system," said Marshall. "We explained to the public that CVFPP was really the State plan and the RFMP was the regional plans. We could show the Legislature and Congress what mattered the most for the State and local areas."

Marshall, who was raised in an area where wilderness was within a quarter mile and downtown was six miles away, has enjoyed rock climbing, hang gliding, Scuba diving, snorkeling, skiing, mountain climbing, cycling, backpacking and whitewater rafting.

"I have few scars, but lots of memories," he said.

During retirement, Marshall plans to add more memories, such as seeing the Northern Lights, fall colors in New England and the Great Barrier Reef. He will also be consulting at a local firm.

Marshall looks forward to seeing his family tree of engineers grow with his son, who is studying to be an electrical engineer.

CELEBRATING 25 YEARS OF

Service

Gia Barrera
San Joaquin Field Division
Administrative Officer II
August 2016

Michael Bradbury
Executive
Program Manager II
August 2016

Eric Butler
Central Valley Flood Protection Board
Supervising Engineer
November 2016

Arthur Hinojosa
Integrated Regional Water Management
Division Chief
October 2016

Nekane (Maria) Hollister
Flood Management
Senior Engineer
July 2016

Kathie Kishaba
Executive
Deputy Director, Business Operations
August 2016

Jeanne Kuttel
Engineering
Division Chief
October 2016

Susan Lee
State Water Project Analysis Office
Senior Engineer
October 2016

Shawn Mayr
North Central Region Office
Senior Engineer
October 2016

Josie Avena Quiambao
Environmental Services
Chemist
November 2016

Robert Reis
Operations and Maintenance
Senior Corrosion Engineer
July 2016

Maureen Sergent
State Water Project Analysis Office
Senior Engineer
September 2016

Gwen Scholl
Hydropower License Planning and Compliance Office
Principal Engineer
September 2016

Sharon Tapia
Safety of Dams
Principal Engineer
November 2016

Scott Woodland
Integrated Regional Water Management
Supervising Engineer
October 2016

No Photo Available

John Berringer
Engineering
Construction Management Supervisor
October 2016

Susan Carroll
Flood Management
Engineer
July 2016

Congratulations DWR Parents

Maggie Dutton, Engineer in the South Central Region Office, has a **son** named **Theodore Dutton** who was born January 2.

Dana Foster, Office Technician in the South Central Region Office, has a **son** named **Harrison Foster** born February 3.

Kristen (K.C.) Richmond, a Senior Engineer in the Division of Flood Management's Flood Operations Branch, has a **daughter** named **Sophie Rae Richmond**, who was born on July 28.

Allen Romero, retired Chief of the Sacramento Maintenance Yard, passed away at the age of 71 on September 10. During his more than 38 years of State service, he worked for Southern and Delta Field Divisions before becoming Sacramento Maintenance Yard Chief until his retirement in 2004. For the past several years, Al worked as a Retired Annuitant in the Flood Maintenance Office, mentoring staff to improve various aspects of maintenance practices.

Al started working for the State as a Laborer in 1965, and worked his way up through the ranks in DWR's Civil Maintenance series. He was promoted to Superintendent of Sacramento Maintenance Yard in October 1985 – just a few months before the historic Flood of February 1986. Al exhibited outstanding leadership in leading critical Yard activities during that flood event, and during subsequent major floods in 1995 and 1997. Al quickly perceived the seriousness of a heavily seeping and slumping levee near the California Highway Patrol Academy in January 1997, and immediately initiated a request for flood fight assistance from the Corps of Engineers, which awarded an emergency repair contract that evening. While the contractor placed rock along the toe of the levee, Al's crews corralled nearby boils with sandbag rings. These two actions prevented floodwaters from inundating West Sacramento.

Al Romero was universally respected inside and outside DWR, and was acknowledged by DWR management, by his peers, and by his staff as an effective leader and a "true gentleman." He received a Management Excellence Award in 1994 for his leadership in sustaining a high level of maintenance effectiveness despite institutional changes and budget reductions. Al was always looking for ways to make improvements; for example, overseeing development of specialized equipment and procedures for grouting rodent holes in levees. Al was also instrumental in making improvements to the Apprenticeship Program and encouraging continuing training for his staff.

Les Harder, who was Division Chief of Flood Management at the time of Al's retirement and recently worked with him on levee vegetation management issues has fond memories of Al.

"Al was wonderful to work with," said Harder. "He had a quiet strength and a smile that was both disarming and reassuring at the same time. When Al was at a flood fight, we were in good hands. I always marveled at Al's ability to remain calm and to kindly, but firmly, direct people in an emergency. I learned a lot from Al. His passing came much too soon and he will be missed."

Al enjoyed spending time with his family, and enjoyed golfing, fishing and cheering for his 49ers. He had a passion for woodwork, home improvements and small hands-on projects.

Al is survived by his wife of 51 years, Barbara, his son Allen Jr., daughter Kim, granddaughters Torri, Sydney, Kendall, and Brooke, great-grandson Blaine and brothers Stan, Edward and James.

Erwin Cooper, retired Public Information Officer and author of *Aqueduct Empire*, passed away at the age of 96 on May 25, 2016.

Cooper, who received letters of commendation from Governor Edmund G. (Pat) Brown and Director William Warne, did an exceptional job of keeping the Southern California news media informed about the work of DWR and its effect on Southern California.

Cooper joined DWR's Southern District Office in 1958 after working for the Department of Veteran Affairs and was on board when voters approved the $1.75 billion bond to finance construction of the State Water Project. Cooper learned about project as it was being created, while also diving deeply into all details of water management.

From 1966 to 1987, Cooper worked as lead PIO for the Department of Motor Vehicles, where he was responsible for creation of *The California Driver's Handbook*.

Aqueduct Empire, published in 1968, is a comprehensive history of water development in California, with emphasis on the State Water Project. Cooper, who was an Army sergeant during World War II in Europe, graduated from the University of California, Berkeley in 1948. After his retirement in 1987, Cooper resided in Chico.

Bill Heyenbruch passed away at the age of 75 after summiting Mount Shasta on July 4. Bill was an Engineer who worked for DWR's Delta Levees Special Projects Program in the Bay-Delta Office for 14 years before retiring in 2013.

He worked on several Delta levee projects, including Decker Island. Prior to DWR, Bill worked for more than 35 years for the U.S. Army Corps of Engineers.

An avid hiker, climber, skier, hunter and angler, Heyenbruch was a graduate of the University of Wisconsin and 38-year resident of Auburn.

Heyenbruch is survived by his wife of 43 years, Marilyn, a son, a daughter and three granddaughters.

An Inside View

Steel replacement pipes (above) for Mojave Siphon Powerplant found on the East Branch of the State Water Project (SWP). The pipelines will carry water through the powerplant to Silverwood Lake. Photo taken by DWR Senior Environmental Scientist Bill Samuels with the North Central Region Office (NCRO) in September of 2015.

Samuels works with NCRO's Recreation Planning and Implementation Program and serves as chairman for the SWP Recreation Coordinating Committee and the Environmental Coordinating Committee Informational Work Group on Recreation and oversees DWR's "Catch A Special Thrill" for Kids program.

DWR Mission Statement

To manage the water resources of California in cooperation with other agencies, to benefit the State's people and to protect, restore and enhance the natural and human environments.

DWR's Bay-Delta Office Fish and Wildlife Scientific Aides Michelle Tyson and Bryan Hongo (right) use nets to collect predatory fish caught in Clifton Court Forebay during an electrofishing study this summer. More than 2500 predatory fish were removed from the Forebay this summer and taken to Bethany Reservoir. The three year study's objective is to improve the survival rate of Chinook Salmon and California Central Valley Steelhead in the Forebay and satisfy the National Marine Fisheries Service's electrofishing interim measure requirement.